3174 Establishment Controller

GA27-3844-0

Planning Guide

Configuration Support A and S Release 5.0

424

Please Return to Room 330

3270 Information Display System

IBM

3174 Establishment Controller

GA27-3844-0

Planning Guide

Configuration Support A and S Release 5.0

First Edition (April 1989)

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Canadian Department of Communications compliance statement

This equipment does not exceed Class B limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe B d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

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 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
3270 Information Display System Introduction, GA27-2739

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, 12R, and 13R User's Guide GA23-0337
Models 51R, 52R, 53R, 61R, 62R, and 63R User's Guide, GA23-0333
Models 81R, 82R, 91R, and 92R User's Guide, GA23-0313

To Plan for and Customize the 3174:

Planning Guide, GA27-3844
Utilities Guide, GA27-3853
Central Site Customizing User's Guide, GA23-0342

To Install Features or Convert Models on the 3174:

Encrypt/Decrypt Adapter Installation and Removal Instructions, GA23-0262
Fixed Disk Installation and Removal Instructions, GA27-3864
Diskette Drive Installation and Removal Instructions, GA23-0263
Terminal Multiplexer Adapter 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
Communications Adapter Installation and Removal Instructions, GA27-3830
Asynchronous Emulation Adapter Installation and Removal Instructions, GA23-0341

To Plan for and Use the Asynchronous Emulation Adapter Feature:

Planning Guide, GA27-3844
Terminal User's Reference for Expanded Functions, GA23-0332
Utilities Guide, GA27-3853

To Use the Multiple Logical Terminals Function:

Terminal User's Reference for Expanded Functions, GA23-0332
Planning Guide, GA27-3844
Utilities Guide, GA27-3853

To Perform Problem Determination:

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

To Obtain Data Stream Programming and Reference Information:

Functional Description, GA23-0218
Data Stream Programmer's Reference, GA23-0059
3174 Character Set Reference, GA27-3831
3270 Character Set Reference, GA27-2837
3270 X.25 Operation, GA23-0204

To Perform Maintenance (Service Personnel):

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Maintenance Information, SY27-2572
Models 51R, 52R, 53R, 61R, 62R, and 63R Maintenance Information, SY27-2573
Models 81R, 82R, 91R, and 92R Maintenance Information, SY27-2584

To Find Translations of Safety Notices:

Safety Notices, GA27-3824

Preface

This is a new publication that replaces the planning information contained in the *3174 Customizing Guide*, GA23-0214. (The customizing and utilities procedures from that book are now described in the *3174 Utilities Guide*, GA27-3853.)

This book 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 will:

- Introduce you to the 3174 Establishment Controller, its features, model capabilities, and supporting microcode
- Inform you of the planning considerations
- Guide you through the planning process
- Provide you with the information and knowledge required for planning
- Teach you the Microcode Customization process
- Aid in filling out the Configuration worksheets
- Give you a solid plan, which when implemented, will result 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 four 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 will aid in planning for 3174 storage and the host.

Part 3. Microcode Customization Planning (Chapters 5 through 15): This part introduces microcode customization and provides the planning information you need to customize the microcode. It describes filling out 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 will 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.

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 customization 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

You may wish to refer to one of these publications for more detailed information on a particular subject:

3174 Establishment Controller:

- *Introduction*, GA27-3850
- *Utilities Guide*, GA27-3853
- *Character Set Reference*, GA27-3831
- *X.25 Operation*, GA23-0204
- *Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R User's Guide*, GA23-0337
- *Models 51R, 52R, 53R, 61R, 62R, and 63R User's Guide*, GA23-0333
- *Models 81R, 82R, 91R, and 92R User's Guide*, GA23-0313
- *Functional Description*, GA23-0218
- *Site Planning*, GA23-0213
- *Central Site Customizing User's Guide*, GA23-0342
- *Terminal User's Reference for Extended Functions*, GA23-0332
- *Installation Guide*, GG24-3061.

ACF/VTAM Installation, ST27-0439.

Contents

Part 1. Introduction

Part 2. General Planning

Part 3. Microcode Customization Planning

Appendixes

Figures

Tables

Part 1. Introduction

Chapter 1. Introduction to the 3174 Establishment Controller

The 3174 Establishment Controller

The 3174 Establishment Controller (Figure 1-1) 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 expandability features.

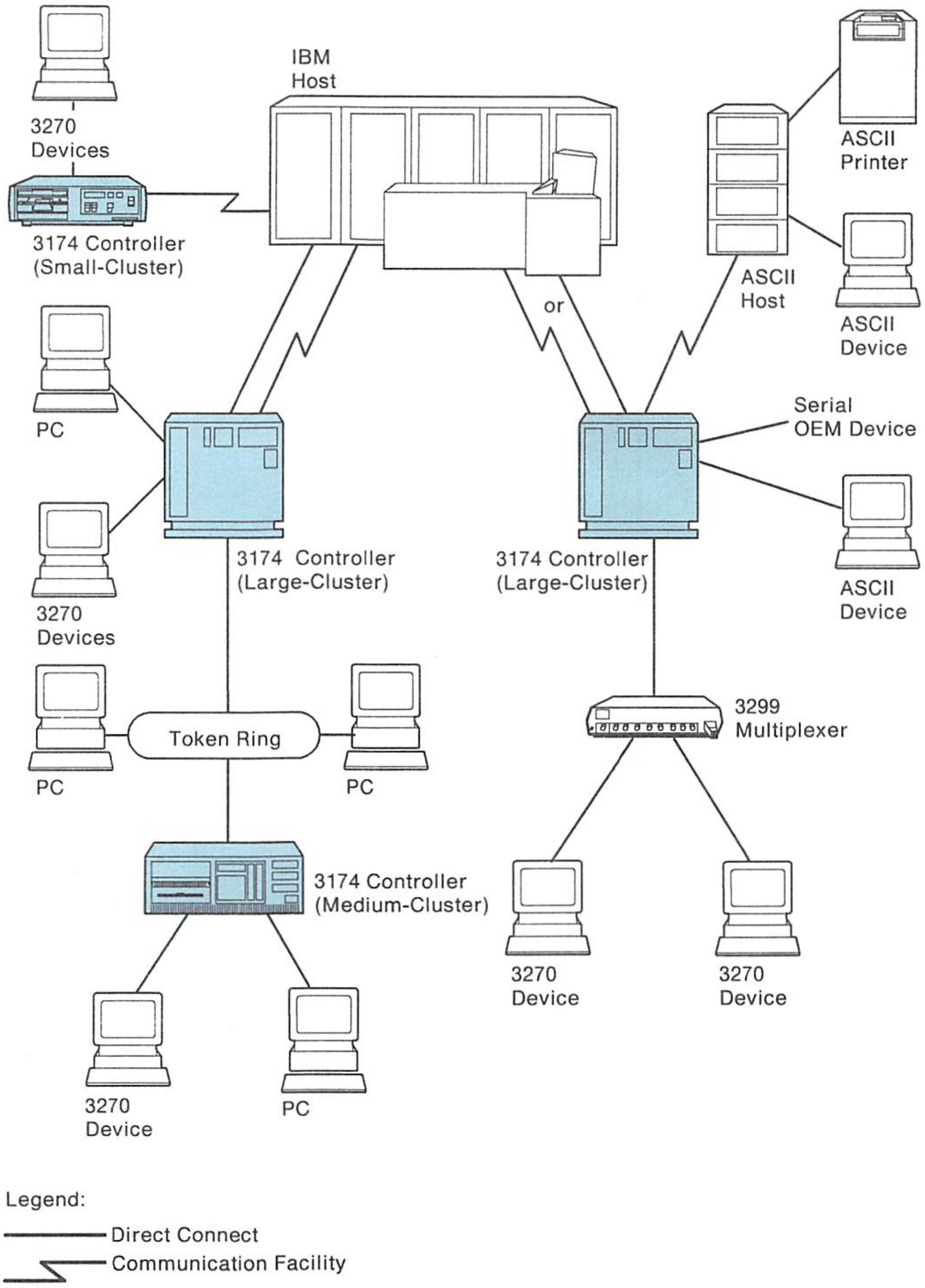

Figure 1-1. The 3174 Establishment Controller

3174 Establishment Controller Models

The 3174 Establishment Controller and the display stations and printers that are attached to it are collectively called a *cluster*. There are several 3174 Establishment Controller models available. Each model falls into one of three categories: large-, medium-, or small-cluster controllers. Figures 1-2, 1-3, and 1-4 illustrate the controller categories and models.

Large-Cluster Controllers

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R (Figure 1-2) are large-cluster controllers for attaching up to thirty-two 3270 devices and/or 24 ASCII devices.

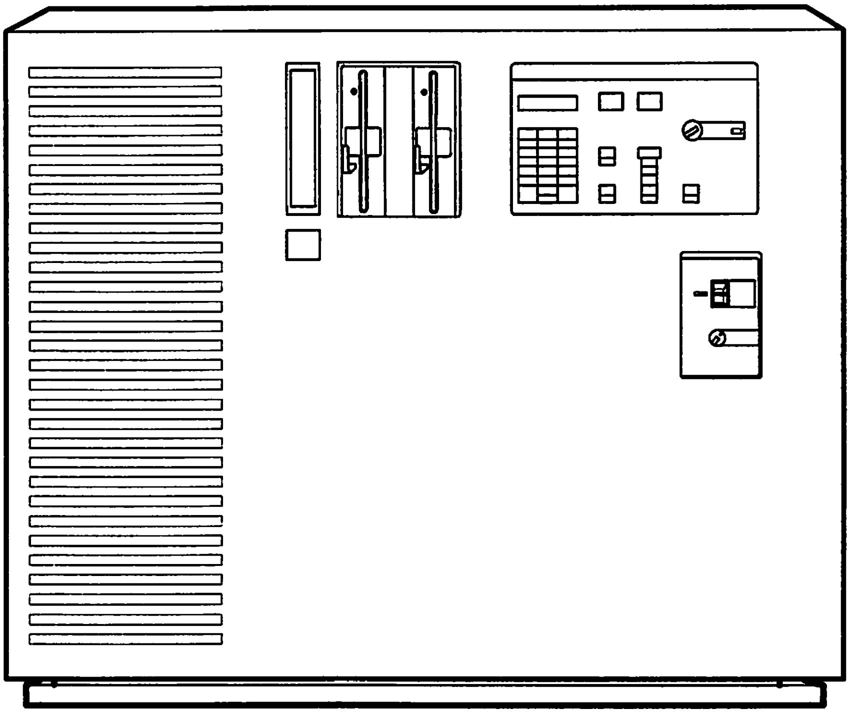

Figure 1-2. Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

Models 1L and 11L have an S/370-type channel adapter for Systems Network Architecture (SNA) and non-SNA for local attachment. They support the following features:

- Terminal Adapter (TA)
- Terminal Multiplexer Adapters (TMAs)
- Type 1 Communication Adapter (EIA/V.35)
- Type 2 Communication Adapter (X.21)
- Token-Ring Adapter
- Token-Ring Network 3270 Gateway feature
- Asynchronous Emulation Adapters (AEAs)
- Second diskette drive
- Fixed Disk Drives
- Storage Expansion.

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

- Terminal Adapter
- Terminal Multiplexer Adapters
- Token-Ring Network 3270 Gateway feature
- Token-Ring Adapter
- Asynchronous Emulation Adapters
- Second diskette drive
- Fixed Disk Drives
- Encrypt/Decrypt Adapter (Model 1R only)
- Storage Expansion.

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

- Terminal Adapter
- Terminal Multiplexer Adapters
- Token-Ring Network 3270 Gateway feature
- Token-Ring Adapter
- Asynchronous Emulation Adapters
- Second diskette drive
- Fixed Disk Drives
- Encrypt/Decrypt Adapter (Model 2R only)
- Storage Expansion.

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 and support the following features:

- Terminal Adapter
- Terminal Multiplexer Adapters
- Type 1 Communication Adapter (EIA/V.35)
- Type 2 Communication Adapter (X.21)
- Asynchronous Emulation Adapters
- Second diskette drive
- Fixed Disk Drives
- Encrypt/Decrypt Adapter (Model 3R only)
- Storage Expansion.

Medium-Cluster Controllers

Models 51R, 52R, 53R, 61R, 62R, and 63R are medium-cluster controllers for attaching up to sixteen 3270 devices and/or eight ASCII devices.

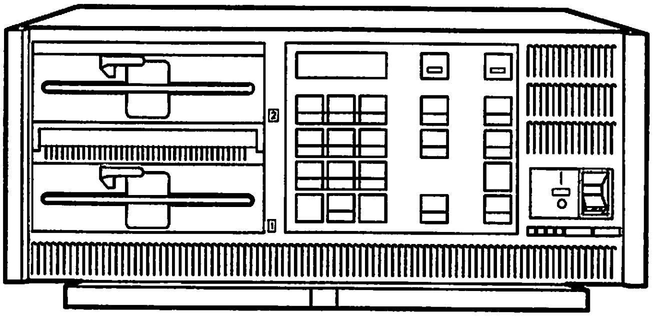

Figure 1-3. Models 51R, 52R, 53R, 61R, 62R, and 63R

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

- Terminal Adapter
- Token-Ring Network 3270 Gateway feature
- Token-Ring Adapter
- Asynchronous Emulation Adapter
- Second diskette drive
- Fixed Disk Drive
- Storage Expansion.

Models 52R and 62R have a Type 2 Communication Adapter designed for remote operation. They contain an X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment to a host and support the following features:

- Terminal Adapter
- Token-Ring Network 3270 Gateway feature
- Token-Ring Adapter
- Asynchronous Emulation Adapter
- Second diskette drive
- Fixed Disk Drive
- Storage Expansion.

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 and support the following features:

- Terminal Adapter
- Second diskette drive
- Fixed Disk Drive
- Asynchronous Emulation Adapter (Model 63R only)
- Storage Expansion.

Small-Cluster Controllers

Models 81R, 82R, 91R, and 92R are small-cluster controllers for attaching up to eight 3270 Information Display System terminals. There are no additional features supported by these models.

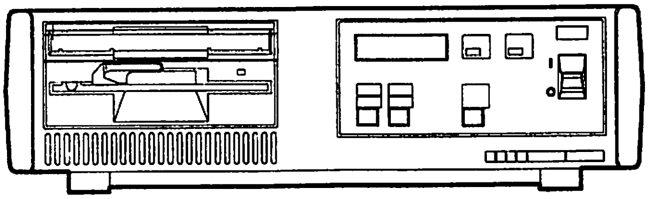

Figure 1-4. Models 81R, 82R, 91R, and 92R

Models 81R and 91R have a Type 1 Communication Adapter designed for remote operation. They contain EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment to the IBM host.

Models 82R and 92R have a Type 2 Communication Adapter designed for remote operation. They contain an X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment to the IBM host.

Features for the 3174 Establishment Controller

There are several features for the 3174 Establishment Controller. Not all of the features are supported on all the models (see "3174 Establishment Controller Models" on page 1-4).

Terminal Adapter allows attachment of 3270 terminals, Terminal Multiplexer Adapters (TMAs), and 3299 Multiplexers.

Terminal Multiplexer Adapter (TMA) allows attachment of 3270 terminals; it attaches to the Terminal Adapter.

Type 1 Communication Adapter (EIA/V.35) provides a telecommunication path to a host.

Type 2 Communication Adapter (X.21) provides a telecommunication path to a host.

Token-Ring Network 3270 Gateway feature allows an IBM Token-Ring Network to attach to the controller and passes information between the Token-Ring Network and an application in the host.

Token-Ring Adapter connects the controller to an IBM Token-Ring Network.

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.

Second diskette drive has many uses, including, for example, to downstream load microcode to DSL devices and to decrease diskette swapping when performing 3174 utilities.

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.

Encrypt/Decrypt Adapter allows encryption of data sent to and from the host.

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

Microcode

Operational microcode for the 3174 Establishment Controller is supplied on a diskette. This microcode can be copied from a diskette onto a fixed disk (with the exception of the Encrypt/Decrypt and RPQ microcode) 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. There are several different disks that you may use:

3174 Utility Disk contains the microcode necessary to run various utilities. A diskette containing this microcode arrives with the controller.

3174 Control Disk, when customized, contains the microcode necessary to make the 3174 Establishment Controller operational. A diskette with this microcode arrives with the controller.

If you have the IBM Token-Ring Network 3270 Gateway feature, use the 3174 Utility and Control disks at Configuration Support-S; otherwise, use the 3174 Utility and Control disks at Configuration Support-A.

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. A diskette with this microcode arrives with network controllers that are ordered under specify code 9005. (See the *3174 Utilities Guide*, GA27-3853, 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 may contain the microcode for up to 30 RPQs.

Downstream Load (DSL) Disks are used for display stations that require the controller to downstream load its operational microcode—for example, the 3290 Information Panel. The Asynchronous Emulation Adapter (AEA) also requires downstream-loaded microcode. If there are no distributed function terminals (DFTs) in the cluster and you are not configuring for the AEA, you will not need to use a DSL disk.

Encrypt/Decrypt Diskette is used to initialize the Encrypt/Decrypt feature in Models 1R, 2R, and 3R. This diskette arrives with the feature.

For more information on these disks, see the *3174 Utilities Guide*, GA27-3853.

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 iv. 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, there are many things that must be considered. This chapter identifies those considerations.

The smoothness of any system installation is directly proportional to the amount of thought that has been focused on the project prior to installation. The 3174 Establishment Controller is no different in this respect than any other system. There are many things that contribute to smooth installation:

- Developing the requirements for your establishment
- Identifying the activities for your specific installation
- Developing a schedule for completing these activities
- Tracking the progress of the scheduled activities by developing checkpoints
- Assigning personnel with the appropriate skills to each activity
- Formal planning of the system
- Support of top management for resources
- Involvement of representatives from each group.

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.

Storage

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

The need for additional storage depends on certain features and functions that you wish to be supported. Additional storage may be required for:

- Token-Ring 3270 Gateway feature
- Asynchronous Emulation Adapter (AEA)
- Central Site Change Management (CSCM)
- Multiple Logical Terminals (MLT).

If sufficient storage is not installed to support these features and functions, some support may be deconfigured (function will not operate or will operate at a lower level) once the controller has been customized and IMLed.

You will need to ensure, through planning, that you have sufficient storage for the features and functions you wish to have supported. In Chapter 3, "Planning for Storage," there is a procedure that will help you determine these storage requirements.

Physical Installation

The controller is a customer-installable product, so the IBM service representative is needed only to attach the channel interface cables (bus or tag) to Models 1L and 11L. 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.

Host Attachment

You need to consider your establishment's needs for host attachment. The attachment capabilities depend on the controller model. The methods of attaching to the host are:

- S/370 Channel
- Communications Link
- Token-Ring
- ASCII.

Local Channel Attachment

Attachment to the host is accomplished using Channel Interface Cables (Bus and Tag). The S/370-architecture channel interface for SNA and non-SNA is used for attachment. Models 1L and 11L are capable of channel attachment and 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.

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

Remote Link Attachment

Remote attachment allows various communication protocols. The communication protocols that can be used are dependent on the controller model and features, which are identified while customizing the microcode on the Control disk.

- For models 1R, 11R, 51R, 61R, 81R, and 91R (with the 232D/CCITT V.24 and CCITT V.35 interfaces), remote attachment allows SNA/SDLC, BSC, and X.25 communication protocols.
- For models 2R, 12R, 52R, 62R, 82R, and 92R (with the CCITT V.11 interface), remote attachment allows SNA/SDLC and X.25 communication protocols.

Token-Ring Attachment

Token-Ring-attached models allow communication with an SNA host. Communication to the host is through a gateway that can be an IBM 3174 with the Token-Ring Network 3270 Gateway feature, or an IBM 3720/3725/3745, AS/400, or 9370 with the appropriate features and software installed.

The Token-Ring 3270 Gateway feature is available only on Models 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, and 62R. Models 3R, 13R, 53R, and 63R have a Token-Ring adapter that provides attachment to the IBM Token-Ring Network.

ASCII Attachment

ASCII attachment is accomplished through the Asynchronous Emulation Adapter (AEA). The AEA is supported on 3174 Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 51R, 52R, 61R, 62R, and 63R. The AEA supports duplex, character-mode, asynchronous transmission of 7-bit ASCII (ANSI[1] 3.4, 1977) data. One or two stop bits, and odd, even, mark, space, or no parity are supported. Autobaud detect and XON/XOFF, DTR, or CTS asynchronous flow controls are supported.

Each port provides an EIA 232D electrical interface and supports transmission speeds of 300, 600, 1200, 2400, 4800, 9600, and 19 000 bits per second (bps) through modems over switched and nonswitched communication facilities or without modems via direct connection.

Terminal Attachment

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

- Direct
- Terminal Multiplexer Adapters (TMAs)
- IBM 3299 Terminal Multiplexers
- 7232 Dual Control Unit Multiplexers
- Asynchronous Emulation Adapter (AEA).

Direct Attachment

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 nine- or four-port Terminal Adapter is installed.

- Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 81R, 82R, 91R, and 92R have a four-port terminal adapter which permits four terminals to be directly attached.
- Models 51R, 52R, 53R, 61R, 62R, and 63R have a nine-port terminal adapter which permits nine terminals to be directly attached.

Terminal Multiplexer Adapters (TMAs)

The Terminal Multiplexer Adapter (TMA):

- Is a customer-installable feature
- Multiplexes the data streams from eight 3270 devices into a single cable
- Can be installed in large-cluster controllers (up to four)
- Is attached to the Terminal Adapter with a short coaxial cable
- Has eight ports, allowing up to 32 terminals to be attached if four TMAs are installed.

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[1] American National Standards Institute

IBM 3299 Terminal Multiplexers

The 3299 Terminal Multiplexer:

- Is a customer-installable feature
- Multiplexes the data streams from eight 3270 devices into a single cable
- Has eight connectors for attaching the terminals
- Is attached to the Terminal Adapter with a coaxial cable
- Allows a single cable run from the controller to a group of users, where you install the IBM 3299.

The controller port locations that you attach the 3299 Terminal Multiplexer to vary depending on the model.

- On large-cluster controllers, you may connect a maximum of four 3299s to the ports on the Terminal Adapter, thereby allowing the connection of 32 devices.
- Medium-cluster controllers have various configurations of 3299 attachment. The 3299 can attach to ports 0 and 8 located on the back of these models, or it can be attached to port 8 and terminals can be attached to ports 0 through 7. Both of these configurations allow 16 terminals to be attached. When you attach a 3299 to port 0, ports 1 through 7 cannot be used.
- On small-cluster controllers, a 3299 may be attached to port 0 for a maximum of eight terminal attachments. Ports 1 through 3 cannot be used in such a case.

7232 Dual Controller Multiplexer

The 7232 Dual Controller Multiplexer:

- Attaches to the controller in the same manner as the 3299 Multiplexer
- Has an additional port to connect to a second controller
- Allows displays attached to the 7232 to communicate with two different hosts.

Asynchronous Emulation Adapter

The Asynchronous Emulation Adapter (AEA):

- Is a customer-installable feature
- Provides asynchronous ASCII communication
- Allows 3270 emulation from ASCII displays and printers as well as ASCII emulation from 3270 devices
- Has eight communication ports to which displays, printers, hosts, and modems can be connected.

The number of AEAs that can be supported varies between controller models.

- On large-cluster controllers, up to three AEAs can be installed, providing a maximum of 24 ports.
- On medium-cluster controllers, one AEA can be installed.
- Small-cluster controllers do not support the AEA.

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 and then set the controller offline 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

There are several areas that you will need to consider for your host applications:

- System definitions
- VTAM and NCP definitions
- VSE/SP2 considerations
- Response Unit (RU) size
- The BIND command
- Failure information
- RTM support
- Response formats
- SOEMI support
- 3174/3274 implementation differences
- Central Site Change Management.

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 method(s) and protocol(s) of host attachment that the controller will provide.

For example, you customize to identify such things as:

- 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 type of communication protocol.

The ability to tailor the microcode provides the following advantages:

- Flexibility
- Ease of adding new features and functions
- Ease of upgrading the microcode level.

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 is explained further in Chapter 5. You should read that chapter before you plan for customization. Following are some of the items that must be taken into consideration:

- Storage requirements
- Host attachment
- Alternate configurations
- Customer-installable features
- Language support
- Country Extended Code Page
- Port assignments
- Printer Authorization Matrix
- Central Site Change Management
- Keyboard modification
- Multiple sessions for terminals
- Downstream load microcode
- Response Time Monitor.

Storage Requirements

As explained earlier, you need to ensure that your controller contains sufficient storage for the features and functions that you wish to have supported. See Chapter 3, "Planning for Storage" when planning for your controller's storage.

Host Attachment

The methods of attaching the controller to the host were described earlier in this chapter. As part of your host attachment, you will need to identify in the microcode the communication protocol you are using:

- BSC
- X.25
- Local Non-SNA
- Local SNA
- X.21 Switched
- Token-Ring Network.
- SDLC and/or X.21 Nonswitched

Configuration question "101: Host Attachment" on page 6-5 identifies this in the microcode.

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 6-1 on page 6-4).

Alternate configurations provide the following advantages:

- Controller flexibility
- Increased communication capabilities
- Backup communications.

To use one of the controllers listed in Table 6-1 on page 6-4 in an alternate configuration, you must configure a Control disk for each communication protocol.

Customer-Installable Features

The following customer-installable features require additional planning and customization:

- Asynchronous Emulation Adapter
- Token-Ring Network 3270 Gateway feature.

The information you will need for planning these features is in:

- Chapter 12, "Planning for the Asynchronous Emulation Adapter" and Appendix B, "AEA Planning Examples"
- Chapter 13, "Planning the Token-Ring Network 3270 Gateway" and Appendix C, "Token-Ring Planning Examples."

Language Support

The controller supports many languages. During planning, you will identify the language you wish to use when responding to configuration question "121: Keyboard Language." The languages supported by the controller are listed in Table 6-4 on page 6-15.

Country Extended Code Page

In addition to the basic language support, the controller provides Country Extended Code Page (CECP) support. CECP provides a larger definition of graphic characters and improves multilingual communication. Desire to use CECP is identified in your response to configuration question 123 on page 6-16. If you wish to use CECP, you must also respond to question 121 with one of the CECP languages listed in Table 6-5 on page 6-16.

Port Assignments

You will need to identify port assignments for your terminals and printers during your customization planning. The vehicle for this identification is configuration question 116, for which there are three possible responses. The planning information you will need, and the responses for question 116, are located in Chapter 7, "Planning for Port Assignment."

Printer Authorization Matrix

The Printer Authorization Matrix (PAM) defines which printers the display stations in a cluster can use for local copy, host copy, and shared copy operations. During planning, you complete worksheets that identify the display stations in the PAM for the different copy operations. The information you will need to complete this phase of planning is located in Chapter 14, "Planning to Define the Printer Authorization Matrix (PAM)."

Central Site Change Management

By customizing for Central Site Change Management (CSCM), you can centrally customize the rest of the controllers in the network. Errors that often occur during customization will be reduced because one person at the central site performs the customization of all the controllers.

The customization data and/or microcode can be sent electronically to the various controllers in the network, and then remotely IMLed. To do this requires the use of the NetView™ Distribution Manager software package at the host.

Read the *Central Site Customizing User's Guide*, GA23-0342, 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 will require layouts that are not standard, the information in Chapter 15, "Planning to Modify Keyboards," will help you plan for modified layouts.

™ NetView is a trademark of the International Business Machines Corporation.

Multiple Sessions for Terminals

Multiple Logical Terminals (MLT) allows a terminal to have multiple sessions with the host. Terminals can access different applications through a key sequence that switches between the different sessions. Desire to use MLT is identified in your response to configuration question "110: Multiple Logical Terminals (MLTs) Configuration Level" (see page 6-11 for more information). Your response defines the number of possible sessions.

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 will need to identify if there are any devices in your configuration that require DSL microcode. If there is more than one type of these devices, you will need to perform the procedure for Merging DSL code in the *3174 Utilities Guide*, GA27-3853.

Response Time Monitor

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 controller until the end of the transaction. 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)."

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, for example, A5.0.

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

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

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

Planning Checklist

This Checklist is suggested for new installations. Your controller may not require all the steps indicated, or it may require additional steps. You can modify the checklist to meet your site's requirements.

Step	Date Scheduled	Responsible		Date Completed	Action
		Customer	IBM		
1		✓			Designate the person(s) in your organization who will be responsible for all phases of the 3174 controller installation.
2		✓	✓		Review this planning checklist with the designated person(s).
3		✓			Review appropriate tasks with the site planner. Have the employee read the site planning manual for information and instructions.
4		✓			Work with the site planner to develop a schedule for installation and to make sure appropriate communication equipment has been ordered.
5		✓	✓		Review the installation schedule with the site planner and the IBM representative.
6		✓	✓		Define your configuration needs. Work with your IBM representative and other appropriate persons to arrive at the desired configuration.
7		✓			Order supplies as determined in Step 6.
8		✓			Review information on the 3174 library in this manual and order the desired manuals through your IBM representative.
9		✓			Develop a training program for employees.
10		✓			Review the progress of the installation schedule. Identify and resolve any schedule conflicts.
11		✓	✓		Review the 3174 controller configuration with your IBM representative to make sure the configuration defined continues to meet your needs.
12		✓			Check with the site planner to verify arrival of equipment and completion of site preparation.
13		✓			Complete the configuration worksheets.
14		✓			Make sure all the necessary information (such as configuration information, customizing worksheets, and so on) is available for appropriate personnel.
15		✓	✓		Verify setup and customization have been done and machines are operational.

Part 2. General Planning

Chapter 3. Planning for Storage

Why Do I Need to Plan for Storage?

The amount of storage originally installed in a controller varies depending on its model number. For models:

- 1L, 1R, 2R, 3R, 51R, 52R, 53R, 81R, and 82R, 1MB of storage is installed
- 11L, 11R, 12R, 13R, 61R, 62R, 63R, 91R, and 92R, 2MB of storage is installed.

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:

- Token-Ring 3270 Gateway feature
- Multiple Logical Terminals (MLT)
- Central Site Change Management (CSCM)
- Asynchronous Emulation Adapter (AEA).

If sufficient storage is **not** installed in the controller, some support for the function(s) you planned will be deconfigured (function will not operate or will operate at a lower level) once the controller has been customized and IMLed. When functional support has been deconfigured, a unique status code appears on the operator panel, an error is written in the 3174 event log, and the IML continues.

For information on viewing the 3174 event logs, see the *Customer Problem Determination* manual, GA23-0217. The *3174 Status Codes* manual, GA27-3832, contains the information on the status code meanings.

Storage Planning Procedure

Planner: Use the following steps to plan your controller's storage.

Step *1* Refer to the table(s) containing the storage requirements for the function(s) you wish to configure.

If you will be configuring:	Refer to:
AEA, CSCM, and/or MLT	Table 3-1 on page 3-4
Token-Ring 3270 Gateway feature	Table 3-2 on page 3-4

If you are configuring for the Token-Ring 3270 Gateway feature, you will need to add either base or functional storage requirements from Table 3-1 to the storage requirements from Table 3-2.

Step ***2*** Use the table(s) you were sent to in step 1 as a matrix to determine your storage requirements. Locate the desired support down the left side of the table and across the top of the table. The number where these two entries intersect is the storage required for your controller's configuration (all values are in megabytes). Examples 1 and 2 on page 3-5 illustrate how to determine storage requirements.

Table 3-1. Storage Requirements for AEA, MLT, and/or CSCM

	Base	**CSCM-0**	**CSCM-1**	**CSCM-2**
Base	1.0	1.0	1.5	1.5
AEA	1.0	1.5	1.5	1.5
MLT-1	1.0	1.0	1.5	2.0
MLT-1, AEA	1.0	1.5	1.5	2.0
MLT-2	1.0	1.5	1.5	2.0
MLT-2, AEA	1.5	1.5	1.5	2.0
MLT-3	1.5	1.5	2.0	2.0
MLT-3, AEA	1.5	2.0	2.0	2.0
MLT-4	2.0	2.0	2.5	2.5
MLT-4, AEA	2.0	2.5	2.5	3.0
MLT-5	2.5	2.5	3.0	3.0
MLT-5, AEA	2.5	3.0	3.0	3.5

Table 3-2. Storage Requirements for the Token-Ring 3270 Gateway Feature

	28 DSPUs	**72 DSPUs**	**116 DSPUs**	**140 DSPUs**
LGATE*	0.5	1.0	1.5	2.0
RGATE*	0.5	0.5	1.0	1.0

*When configuring for the 3270 Gateway feature only, add the base storage requirement from Table 3-1 to the values from Table 3-2 to obtain the total storage required.

Legend

AEA	Asynchronous Emulation Adapter
MLT 1–5	MLT levels
CSCM-0	CSCM for a Central Site Controller with diskette drives only or a Network Site Controller with up to two fixed disk drives
CSCM-1	CSCM for a Central Site Controller with up to one fixed disk drive
CSCM-2	CSCM for a Central Site Controller with up to two fixed disk drives
LGATE	Local models with the 3270 Gateway feature (not valid with CSCM-1 or CSCM-2)
RGATE	Remote models with the 3270 Gateway feature (not valid with CSCM-1 or CSCM-2)
DSPUs	Downstream physical units

Step *3* Ensure that your controller contains sufficient storage by comparing the storage requirements for the functions you want configured with the storage installed in the controller. If the storage installed in the controller is less than the storage required for the function(s) you want, you will need to add storage or leave some function unconfigured.

Storage Planning Examples

Example 1

Assume you want to configure AEA and CSCM-1 (see the legend on page 3-4). Step 1 directs you to Table 3-1. As shown below, find AEA down the left side and CSCM-1 across the top. The storage required is 1.5 megabytes.

	Base	CSCM-0	CSCM-1	CSCM-2
Base	1.0	1.0	1.5	1.5
AEA	1.0	1.5	1.5	1.5
MLT-1	1.0	1.0	1.5	2.0

If you are configuring for the 3270 Gateway feature only, you will need to add the base storage requirements from Table 3-1 on page 3-4 to the storage you will require for the 3270 Gateway feature. If you are configuring for the 3270 Gateway feature in addition to one or more other functions, add the storage required for the other function(s) to the storage required for the 3270 Gateway feature (do **not** add in the base requirements; see Example 2).

Example 2

You want to configure for MLT-1, CSCM-0, and the Token-Ring 3270 Gateway feature on a Remote Model (RGATE) with 72 DSPUs.

1. Find the storage required for MLT-1 and CSCM-0 (1.0MB).

	Base	CSCM-0	CSCM-1	CSCM-2
Base	1.0	1.0	1.5	1.5
AEA	1.0	1.5	1.5	1.5
MLT-1	1.0	1.0	1.5	2.0

2. Find the storage required in Table 3-2 (shown below).

	28 DSPUs	72 DSPUs	116 DSPUs	140 DSPUs
LGATE	0.5	1.0	1.5	2.0
RGATE	0.5	0.5	1.0	1.0

The storage requirements for an RGATE with 72 DSPUs is 0.5MB. Add the storage required for MLT-1 and CSCM-0 to the storage required for an RGATE with 72 DSPUs (1.0MB + 0.5MB = 1.5MB).

Chapter 4. Host System and 3174 Planning

An Overview of Host System and 3174 Planning

Several things must be considered when planning for the host to ensure that it will support 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 the user of this information has 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.

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

Token-Ring Network 3270 Gateway Feature Considerations

To communicate with a host, devices attached to a Token-Ring Network must use a gateway to map Token-Ring protocols and frames to certain SNA protocols and request units. A 3174 Model 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, or 62R with the 3270 Token-Ring Gateway Feature serves this function. This 3174 gateway allows devices on the Token-Ring Network to communicate with an IBM host.

A 3174 Establishment Controller with the IBM Token-Ring Network 3270 Gateway feature is defined at the host as an SNA channel-attached or telecommunication-attached controller.

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

When the 3174 Gateway is customized, a list of Token-Ring addresses of the devices to be serviced by the gateway is defined. If downstream physical units (DSPUs) have to be added or deleted, the gateway customization must be updated to reflect the new configuration.

The 3270 Token-Ring Gateway is supported by the following programs:

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

Application programs supporting 3274-41A with Configuration Support-D, Release 65 need not be altered unless they interpret certain SNA sense information. A section on SNA sense codes is included in this chapter.

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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. (See configuration questions "940: Ring Address Assignment" on page 13-9 and "941: Ring Transmission Definition" on page 13-13.)
- The inbound frame from a DSPU to a local gateway exceeds the host read channel program size or 1032 bytes, *whichever is smaller.*
- The inbound frame from a DSPU to a remote gateway exceeds 457 bytes.

System Definitions Used with the Gateway Feature

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

MVS/SP Definitions

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

- The UNIT parameter of the IODEVICE macro must be coded

  ```
  3791L
  ```

- The ADDRESS parameter of the IODEVICE macro allows specification of multiple Token-Ring-attached devices.
- A single IODEVICE macro should be coded, with the ADDRESS parameter specifying multiple devices. (Note that XA systems require IOCP generation and use the IODEVICE and CTLUNIT macros.)

VM/SP Definition

The following examples are valid definitions for the 3174 Model 1L and 11L acting as a Token-Ring 3270 Gateway and for the ring-attached downstream physical units (PUs). 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.

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 cluster controllers or workstations supported by a single 3174 Model 1L or 11L with the gateway feature installed. The value given in the FEATURE parameter must be a multiple of 16. For the maximum number of workstations or controllers (140) 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 and 11L as CUTYPE = 3705.
- The RDEVICE macro defines the 3174 Model 1L and 11L and each Token-Ring-attached node as DEVTYPE = 3705.
- In the IODEVICE macro, each 3174 Model 1L and 11L and each Token-Ring-attached device are defined as 3791L. The parameter is UNIT = 3791L.

A RDEVICE macro must be coded for the gateway itself and for each Token-Ring-attached cluster controller or workstation (PU).

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 will not automatically recognize and generate ADD statements for locally attached 3174 Models 1L or 11L. The user 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 or 11L is to be handled as a 3274-A41.

Channel Type VS UCW Definition

For a 3174 gateway, unit control words (UCWs) must be set up according to the channel type:

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

VTAM Definition

If *n* Token-Ring nodes 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.

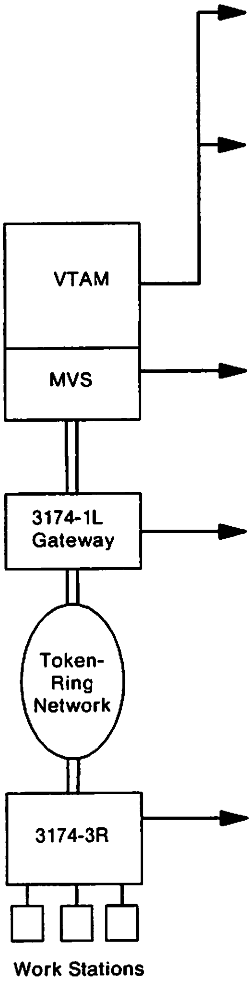
A subchannel or SDLC address must be defined for each workstation or cluster controller attached to a Token-Ring Network. The 3174 Establishment Controller with the 3270 Gateway feature that is being defined must also have a subchannel or an SDLC address assigned, and it must be the lowest subchannel or SDLC address in the ring. *These addresses 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 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* **Definition Considerations**



VTAM Start Parameters

```
10BUF=(baseno,270,.....)
```

VTAM Local SNA Major Node (SYS1. VTAMLIST):

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

MVS System Generation Macros:

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

Gateway Feature Customizing Questions:

```
104   = E0 (low subchannel address)
105   = E1 (high subchannel address)
900   = 4000317402E0 (Token-Ring Network 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 (3174-3R Token-Ring Adapter address)
107 =  4000317402E0 (Token-Ring Network Gateway address)
380 =  2042   (Matches gateway question 941)
381 =  1      (Default)
382 =  1033   (Matches VTAM Read Channel Program Size)
383 =  2      (Default)
```

*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 Network 3270 Gateway

NCP Definition

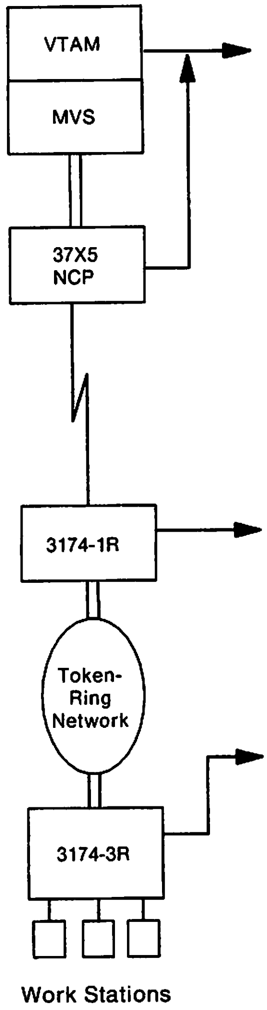
Generally, NCP definitions follow the same guidelines as the VTAM definitions described in "VTAM Definition" on page 4-6. Some coding tips for NCP are listed below:

- A PU macro should be defined for each ring-attached PU; 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, will be contiguous.
- Segmenting will be done by the 3174 when the MAXDATA parameter is set to a value greater than the F value specified for question 941 in gateway customization.
- 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.

Figure 4-2 on page 4-9 shows that the NCP MAXDATA size of 521 is used. The Token-Ring frame size (response to question 941 for the gateway and response to question 380 for the Model 3R) are set to accommodate this frame size; the NCP MAXDATA frame size and the Token-Ring frame size do *not* need to match. Defaults were used for window sizes.

Example Configuration* **Definition Considerations**



NCP Generation Macros:

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

Gateway Feature Customizing Questions:

```
104   = E0 (low SDLC address)
105   = E1 (high SDLC address)
900   = 4000317402E0 (Token-Ring Network Gateway address)
940:  Ring @ = 4000317402E1 (3174-3R Token-Ring Adapter address)
941:  F   = 1 (Frame size = 521)
      W = 2 (Default window size)
```

3174-3R Customizing Questions:

```
106 =  4000317402E1 (3174-3R Token-Ring Adapter address)
107 =  4000317402E0 (Token-Ring Network Gateway address)
380 =  521    (Matches gateway question 941)
381 =  1      (Default)
382 =  1801   (4 x 448 (gateway I/B frame size) + TH + RH)
383 =  2      (Default)
```

*3174 Model 1R attachment to a NCP with one 3174 Model 3R attached to the Token-Ring Network

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

3174 Downstream Physical Units

IBM 3174 Models 3R, 13R, 53R and 63R attach to the Token-Ring Network and communicate with a host through a gateway. These models 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 gateway type.

DSPUs appear to the host access methods and applications as a PU type 2.0. Certain sense information generated by the PUs is different from that generated by 3274 controllers. Sense information is described later in this chapter and in the *3174 Functional Description.*

During the customization of DSPUs, you define the address of the gateway and the characteristics of the link. This section offers tips for customizing DSPUs. However, only those questions specifically dealing with Token-Ring attachment are described. There are other questions that must be given consideration when customizing your DSPU. For more information on these configuration questions, see Chapter 6, "Planning to Configure."

In addition to the information provided here and in Chapter 6, examples of planning for gateways and DSPUs are provided in Appendix C.

Designating Models (Question 100)

Valid responses for DSPUs are 3R, 13R, 53R and 63R.

Defining the Host Attachment (Question 101)

You must respond to this question with a 7 (Token-Ring Network) for all DSPU models.

Assigning a Token-Ring Address for the DSPU (Question 106)

Your response must contain 12 hexadecimal digits that represent the Token-Ring address of the 3174 DSPU you are customizing.

The address can be either a locally administered address or a universal address. (See question 106 on page 6-9 for more information.)

Notes:

1. A response of all zeros will cause the Token-Ring adapter to operate with the universal address.
2. 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 will expect to be connected by way of telephone lines.
3. The response to this question cannot be the same as the response to question 107.

Ask your network planner for this address.

Assigning an Address to the Gateway (Question 107)

Your response must contain 12 hexadecimal digits that represent the Token-Ring address of the gateway that your DSPU is using to communicate with the host.

This address can be either a locally administered address or a universal address. (See question 107 on page 6-10 for more information.)

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 will expect 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. For a DSPU to communicate with a different gateway, you must re-IML the DSPU with a Control disk that contains the new gateway's address.

Ask your network planner for this address.

Identifying Physical Units (Question 215)

The Physical Unit Identification (PUID) consists of five hexadecimal digits in the range 0 through F hexadecimal. The default value is 00000. Each PUID in the network should be unique because it identifies the controller to the host in response to an XID command.

Defining the Maximum Receive I-Frame Size (Question 380)

The response consists of 4 numerical characters padded (if necessary) with leading zeros. The default value is 2042.

- 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 4105 bytes.

Notes:

1. The response to this question is dependent upon your gateway and ring configuration. For additional information, see Chapter 13, "Planning the Token-Ring Network 3270 Gateway."
2. If your gateway is the 3174 Token-Ring Network 3270 Gateway feature, the response to this question should match the F-field response in question 941. (See Chapter 13 for information on question 941.)
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 I-frame size should include the length of the transmission header (TH) and response header (RH). For example, if the maximum length of a request unit (RU) segment is 1024, the I-frame size specified should be 1033 (1024 + 9 for the TH and RH).

Defining the Size of the Token-Ring Network Maximum In (Question 381)

The response must be a number in the range 1 to 7. The default value is 1.

This field specifies the maximum number of link level I-frames that the 3174 DSPU receives before transmitting an acknowledgment and may also be referred to as the "receive window size."

Notes:

1. The response to this question is dependent upon your gateway and ring configuration.
2. If your gateway is the 3174 Token-Ring Network 3270 Gateway feature, the response to this question should be equal to or less than the W-field Maximum Out (Transmit Window Size) specified in question 941. (See Chapter 13 for information on question 941.)

See the discussion on the relationship between questions 381 and 941 on page 6-40.

Defining the Maximum Transmission I-Frame Size (Question 382)

The response consists of 4 numerical characters padded (if necessary) with leading zeros. The default value 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.

Notes:

1. The response to this question is dependent upon 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).

Defining the Size of the Token-Ring Maximum Out (Question 383)

The response must be a number from 1 to 7. The default value 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.

Defining the Ring Speed of the Token-Ring Network (Question 384)

The response consist of one of the following:

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.

SNA Considerations for the 3174

3174-3274 SNA Implementation Differences

The following differences exist between the 3174 and the 3274 in the area of SNA implementation. The 3174 conforms to the current architecture in these areas.

- The 3174 returns -R(1007) to Network Control commands rather than the -R(1003) sent by the 3274.
- The 3174 goes to a quiesced state upon receipt of a +RESP to a SHUTC request instead of when the request is sent.
- The 3174 sends Notify (X'0C') as soon as the LU's power-on/power-off state changes, whether or not the LU is currently in an LU-LU session.

How LU-1 Pacing Overruns are Handled

For the 3174, there are device dependencies because a printer is slower than the display. The user 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.

3174

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.

3274

On the 3274, the chain in the process of being printed was rejected with -R(0801) and any unprocessed chains in the printer buffer were cleared.

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.

Machine Type Identification

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

The type number will be included in place of "3274" as 4 bytes of EBCDIC data in controller alerts and as 2 bytes of hexadecimal data when a sense ID is issued. The machine type designation is 3174.

Error Identification Data

The 3174 can identify certain errors with a greater level of isolation detail than the 3274.

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 will also provide additional failure information on certain classes of SNA datastream errors. This information will be called *error detail* and will be 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 IBM Token-Ring Network 3270 Gateway feature (3025), 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 Fix (PTFs) required for VSE.
  - NetView program.
- For 3174 Establishment Controllers with the optional IBM Token-Ring Network 3270 Gateway feature (3025), the NetView program is required.
- The Response Time Monitor, a base IBM 3174 function, is supported by:
  - NLDM, Release 2, for VM/SP (with or without HPO).

Description/User Action Code Additions

To accomplish the above, the 3174 requires the alerts shown in Table 4-1, in addition to those supported for both the 3274 and the 3174. These new alerts are supported by the Network Problem Determination Application (NPDA) Version 3 Release 2 and applicable PTFs and the NetView program.

Table 4-1 (Page 1 of 2). Alert Code Description

Alert Type	**General Cause**	**Specific Component**	**Action Code**	**DTR* Code**	**Error Description**	**Probable Cause**
01	01	See Note 1	FE40	FE0B	Permanent CU error	Hardware
01	01	See Note 1	FE41	FE0C	Permanent CU error	Hardware
0F	01	See Note 1	FE42	FE0B	Delayed CU error	Hardware
0F	01	See Note 1	FE43	FE0C	Delayed CU error	Hardware
02	01	See Note 1	FE44	FE0B	Temporary CU error	Hardware
02	01	See Note 1	FE45	FE0C	Temporary CU error	Hardware
01	01	006E	FE46	FE0B	CU error	Battery
01	01	000E	FE47	FE02	Terminal Multiplexer error	Terminal Multiplexer
02 or 03	01	See Note 1	FE48	FE0B	CU error threshold exceeded	Hardware
02 or 03	01	See Note 1	FE49	FE0C	CU error threshold exceeded	Hardware
02	0D	0056	FE4A	FE0D	SNA data stream error	Host program
01 or 04	06	See Note 2	FE4B	FE0B	CU error	DASD media
01, 02, or 03	01	00FF	FE4C	FE02	Device attach error	Transmission line/device
02	0F	00FF	FE4D	FE02	Host link communication error	Host communication
0F	0F	00FF	FE4D	FE02	Host link communication error	Host communication
0F	01	See Note 1	FE4E	FE01	Delayed CU error	Hardware/ microcode (requires the NetView program)
0F	0F	00FF	FE4F	FE0F	Host link communication error	Host communication (requires the NetView program)
01	01	0012	FE60	FE60	Initialization failure	Token-Ring Adapter
01	01	0012	FE61	FE61	Open failure	Token-Ring Lobe

Table 4-1 (Page 2 of 2). Alert Code Description

Alert Type	General Cause	Specific Component	Action Code	DTR* Code	Error Description	Probable Cause
01	01	0012	FE62	FE62	Open failure	Token-Ring Lobe/Network
01	01	0012	FE63	FE63	Open failure	Token-Ring Fault Domain
01	12	0012	FE64	FE64	Open failure	Token-Ring Duplicate Station Address
01	02	0012	FE65	FE65	Open failure	Token-Ring Remove command received
01	01	0012	FE66	FE66	Lobe wire fault	Token-Ring Lobe
01	01	0012	FE67	FE67	Auto removal	Token-Ring Lobe
01	01	0012	FE68	FE68	Token-Ring Remove command received	User
01	01	0080	FE69	FE69	Token-Ring inoperative	Fault Domain
02	01	0080	FE6A	FE6A	Token-Ring Temp error recovered	Fault Domain
01	01	0012	FE6B	FE6B	Adapter check	Token-Ring Adapter
02	01	0080	FE6C	FE6C	Excessive Token-Ring errors	Fault Domain
02	01	0080	FE6D	FE6D	Connect failure	Token-Ring remote device

Notes:

1. The information in this field will vary with the specific error and will be consistent with the definitions in the *SNA Format and Protocol Reference Manual,* SC30-3112.

   Codes used are X'0001', X'0004', X'0012', X'0014', X'0061', X'0062', X'006E', and X'00FF'.

2. Code X'0061' or X'0062' is used.

   In addition, when X'0062' is present, a CNM Hierarchy Name List subvector, X'03', is included. The contents of the vector are:

X'0E'	Length
X'03'	Hierarchy Name List Subvector
X'00'	Reserved
X'01'	Number of entries
X'06'	Length of resource name
C'DSKT1'	Resource name (or C'DSKT2')
C'DSKT'	Resource type identifier (X'C4E2D2E3')

* DTR — See "Detail Text Reference" on page 4-18.

Detail Text Reference

The user action panels specified in Table 4-1 on page 4-16 indicate new detail text reference (DTR) panels. The details are listed below:

Detail Text Reference	**Q1**	**Q2**	**Q3**
FE02	ERROR CODE	PORT NUMBER	(not used)
FE0B	ERROR CODE	TYPE,LOC	(not used)
FE0C	ERROR CODE	TYPE,LOC	TYPE,LOC
FE0D	ERROR CODE	LU	ERROR DETAIL
FE0E	This code is reserved for future expansion		
FE0F	ERROR CODE	ERROR DETAIL	(not used)
FE60	ERROR CODE, Link Subsystem Name	Initialization Interrupt Reg	(not used)
FE61 – FE65	ERROR CODE, Link Subsystem Name	Open Error Code	(not used)
FE66 – FE6A	ERROR CODE, Link Subsystem Name	Ring Status	(not used)
FE6B	ERROR CODE, Link Subsystem Name	Adapter Check Status	(not used)
FE6C – FE6D	ERROR CODE, Link Subsystem Name	(not used)	(not used)

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 matrix defines the RECFMS response generated by the 3174 in response to an REQMS of the type identified as received from the host.

	3174 Response for:		
REQMS Type	**SNA/SDLC**	**X.25**	**SNA Channel**
1	+	+	-
2	+	-	-
3	+	-	-
5	*	*	*

Where:

+ = Same response as 3274
- = Rejected with negative response X'080C'
* = See "RECFMS Type 5 Response Formats" on page 4-20.

The negative responses for X.25 are the same as the 3274 RECFMS support.

RECFMS Types 2 and 3 are not supported by the 3174 on the SNA channel.

Node ID Block Number for RECFMS

The 3174 will return a block number of X'048' (decimal 72) in RECFMS headers. The block number for XID will be X'017', which is the same as the value returned by the 3274 Control Unit.

The block number of X'048' has been assigned by architecture and is authorized for use in RECFMS only.

RECFMS Type 5 Response Formats

In response to an REQMS Type 5 from the host, the 3174 will alternately send one of two different RECFMS Type 5 response formats to the host. These response formats, further described below, are self-identifying. The first response type contains the 3174 configuration table information. The second type contains information on microcode patches applied, RPQs applied (with level information), and DFT Load diskettes installed (with level information).

After receipt of an ACTPU, the 3174 will send the configuration table in response to the first REQMS Type 5 from the host. The next REQMS Type 5 will retrieve the second response type format. Succeeding REQMS Type 5 requests will retrieve the second response format if the continuation byte indicates more data. If the continuation byte indicates no further data, then the first response type format will be sent at the next request from the host. This alternating pattern between the two response types will continue as long as the physical unit is active.

FORMAT 1

RU Byte	Value	Meaning
14	X'02'	Always X'02' (3174 data).
15	X'01'	This identifies format 1 data (configuration table).
16 – 255		This data is the same as the 3174 configuration table, bytes 0 – 239, and is contained in *Customer Problem Determination*, GA23-0217.

FORMAT 2

RU Byte	Value	Meaning
14	X'02'	Always X'02' (3174 data).
15	X'02'	This identifies format 2 data.
16 – 247		This data contains installation and change-level information on 3174 RPQs, patches, and DFT Load diskettes, and is contained in *Customer Problem Determination*, GA23-0217.
248		Continuation character:
	X'00'	Continue sending format 2.
	X'FF'	No more format 2 data.

In response to the first REQMS Type 5 from the host, the 3174 will send a format 1 response. In response to the second REQMS Type 5, the 3174 will send a format 2 response. The 3174 will continue to send a format 2 response to further requests until the continuation byte (last byte of the response) indicates that no further data will follow. Then, a format 1 response will be sent at the next request from the host.

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

SNA Channel Attachment

Current host programming support operating with the 1536-byte outbound request/response unit (RU) size limit and a 1024-byte inbound RU size limit imposed by the 3274 A models continues to function without change. Only those programs that are designed to take advantage of the increased maximum RU size require change. The maximum RU sizes for the 3174 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. 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).

SNA TP Attachment

In non-X.25 environments, current host programming support that limits the RU size within a segment element to 256 bytes will continue to function without change. Only those programs that want to take advantage of the improved performance provided by an increased maximum RU size within a segment element require change. The maximum outbound RU size within a segment for the 3174 is 512 bytes.

In X.25 environments, the maximum outbound RU size within a segment remains 256 bytes.

XID 1 SUPPORT

To allow the primary station to determine that the 3174 has the capability to support a 512-byte PIU size, XID 1 will be supported instead of the XID 0 supported by the 3274. Current host programming support should continue to function unchanged. See Table 4-2 for the hexadecimal value and meaning of each byte.

XID 1 FORMAT

Table 4-2. 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' (SDLC) X'0109' (X.25)	Maximum I-field length: SDLC=521 bytes X.25=265 bytes
12	X'00'	SNA link profile
13	X'00'	SDLC 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 SDLC controller address
19		SDLC 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

BIND extensions indicated below are also available on the 3274 Release 65, Configuration Support-D.

Unspecified Viewport (Screen) Size BIND

In byte 24, bits 1–7, the binary value '0000011' (unspecified viewport size) is supported. This BIND value causes the 3174 to set the default screen size to 24 × 80 (1920 characters), and the alternate screen size as specified by the display model size. For example, a screen size of:

24 × 80 for a 3278 Model 2 (or equivalent) or a 3180/3192 Model ID 6
32 × 80 for a 3278 Model 3 (or equivalent) or a 3180/3192 Model ID 7
43 × 80 for a 3278 Model 4 (or equivalent) or a 3180/3192 Model ID 8
27 × 132 for a Model 5 or a 3180/3192 Model ID 9

This allows the alternate screen size to be returned to the host in the Query Reply (Implicit Partition) structured field.

BIND Support for 3180/3192/3193 Display Station

When a 3180/3192 Display Station has been set up by an operator as a Model 6, 7, 8, or 9, the 3174 will accept any BIND for the 3180/3192 that meets the following criteria:

- For an 80-column BIND, row counts 1–43
- For a 132-column BIND, row counts 1–27.

Thus, BINDs for Model 2–5 screen sizes will be accepted for a 3180/3192 Display Station (Models 6–9) regardless of the screen size set by the operator.

The 3174 regards 3180/3192 Display Stations that are designated by the operator as Models 6, 7, 8, or 9, as equivalent to 3278 Display Stations Models 2, 3, 4, or 5, respectively, and as having 3180/3192 extended functions (such as scrolling, row column, and create partition) enabled. The 3174 uses extended functions to allow host applications to set viewport size via the BIND, when in implicit-partition state.

Response Time Monitor

Except for the functions listed below, the 3174 RTM function is identical with RTM support on the 3274.

- The solicitation of data from all LUs from the host is not supported.

  Note: The solicitation of data from **all LUs with nonzero** data is supported in the same manner as the 3274.

- The ability to activate/deactivate RTM alerts from the host is not supported. The ability to make this choice via customizing option remains.
- The bit that was used by the host to indicate to the controller to use or not to use the SNA address list is not used by the 3174. If the SNA address list is included in the request, it is always used. If the SNA address list is not included, all LTs are assumed and acted upon.

  Note: The 3174 does support this bit in RTM replies but not in RTM requests.

Channel Status

Non-SNA Channel Attachment

When the 3274 attempts to perform a Write, Erase/Write, Erase/Write Alternate, or Write Structured Field command, but finds after returning *initial status* of zero that the addressed device is busy, an *ending status* of CE + DE + UE (with or without CUE) is returned.

For these same conditions in the controller, *first ending status* of CE is returned followed by *second ending status* of DE + UE (with or without CE).

The 3174 supports a *channel command retry* facility, which the 3274 does not support. If the 3174 has been customized to use the *channel command retry* facility and is attached to a channel that does not support this facility, status of CE + DE + UC + SM will be passed to the host-device error recovery procedures (ERPs).

SNA Channel Attachment

The 3274 returns *initial status* of zero for all commands.

In the 3174, *initial status* may be zero, CE, CE + DE, UE (with or without A), or UC. In addition, for those commands that return CE as *initial status*, *ending status* may be DE + UE (with or without A).

The 3174 supports a *channel command retry* facility, which the 3274 does not support. If the 3174 has been customized to use the *channel command retry* facility and is attached to a channel that does not support this facility, status of CE + DE + UC + SM is passed to the host-device ERPs.

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 will send SIGNAL (00010000) to the host application as a request for "send state." If CD is not received prior to the receipt of an FMH(EDS), the controller will return 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 OEM Interface (SOEMI) Support

Serial OEM Interface (SOEMI) support is included in the 3174 base function. This function is available with the non-SNA channel attachment only.

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 the user 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 Serial Original Equipment Manufacturer Interface (SOEMI) is attached.

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

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 Distribution Services (SNADS)
- SNA Management Services
- SNA File Services.

For detailed information on CSCM, see the *Central Site Customizing User's Guide*, GA23-0342.

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 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 the Netview Distribution Manager (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 PU3174" on page D-6 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).

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 method(s) and protocol(s) of host attachment that the controller will provide.

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

- 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 type of communication protocol.

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

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

Planning the Customization

There are two suggested methods that you can use to plan. Both are printed 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" summarizes the things you need to plan for, the sequence to plan them, the worksheets to fill out, and the chapters containing the planning information you need. This method is suggested for those who are familiar with microcode customization planning and have been through "Microcode Customization Planning" 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 method 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 Response Time Monitor (RTM)
- Planning for X.25
- Planning for Central Site Change Management (CSCM)
- Planning for the Asynchronous Emulation Adapter (AEA)
- Planning for the Token-Ring 3270 Gateway
- Planning to Define the Printer Authorization Matrix (PAM)
- Planning to Modify Keyboards.

The first planning phase, "Planning to Configure," is required; depending on the needs of your establishment, 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

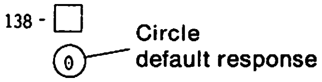
The worksheets are provided to help plan and record customizing information. Blank copies of these worksheets are located in Appendix A. You are authorized to make as many copies as you need. However, to avoid confusion, copy only the worksheets you will be using. The information printed on the divider page labeled "Worksheet Summary" will help 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 you are planning for. The configuration questions are numbered (099, 100, 101, 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.

Read and answer only the questions shown on the worksheet. Where to find the planning information, a list of the question numbers, and a short description of each question can be found on each 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.)



After you have completed all the worksheets required for your configuration, give the completed worksheets to the person who will customize the Control disk. How to enter this configuration information on the disk is explained in *3174 Utilities Guide*.

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
- Encrypt/Decrypt
- Media Management
- Identify Customizing Keyboard
- Define PAM
- Merge RPQ
- Modify Keyboards
- AEA Configure.

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 menu panels appearing on the screen ask a number of questions. Responses to those questions are typed in using the information recorded on the Configuration Worksheets. These responses are written onto 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 12—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.

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, for example A5.0.

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 other tasks that must be performed on the new Control disk after the Microcode Upgrade, including:

- 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.* The information required for selecting a response to the configuration questions not supported by the previous release is in this manual.

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 each Utility and Control disk 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 *3174 Utilities Guide*.

You should identify any diskette(s) 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.

Central Site Customizing

See the *Central Site Customizing User's Guide*, for the Central Site Customizing procedure.

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.

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 use the copy procedure, the controller used will require two disk drives.

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.)

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 *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 01, 02, and 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*, GA23-0342, for more information.

Chapter 6. Planning to Configure

Getting Ready to Plan to Configure

Before you start, you need the following:

- 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.
- You may need the *3174 Character Set Reference*, GA27-3831, if you plan to change keyboard layouts.

Configuration Questions

Some, but not all, of the following configuration questions appear on the worksheets you are instructed to fill out during the first two steps of the procedure printed on the divider page labeled "Microcode Customization Planning." The questions that appear depend on the type 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 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 099, 100, and 101 on the worksheet.

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 means of recording the name(s) and telephone number(s) of a person or persons to contact should there be problems with the controller. You may leave blanks wherever you have not written an alphanumeric character.

100: 3174 Model Designation

Response:

01L
01R
02R
03R
11L
11R
12R
13R
51R
52R
53R
61R
62R
63R
81R
82R
91R
92R.

Enter the model number or the alternate configuration (see Table 6-1) of the controller you are planning the customization for.

Note: All models that have the Token-Ring Gateway feature installed, can be customized as the gateway controller in the primary or alternate configuration.

Table 6-1. Alternate Configurations. These alternate configurations are for models that can contain, in addition to their primary communications adapter, a Type 1, Type 2, or Type 3 communications adapter.

Primary Configuration	Additional Adapter Type	Alternate Configuration
Model 01L	Type 1 (3040 or 3041)	Model 01R
	Type 2 (3043)	Model 02R
	Type 3 (RPQ 8Q0575 or 3044)	Model 03R
Model 01R	Type 3 (RPQ 8Q0575 or 3044)	Model 03R
Model 02R	Type 3 (RPQ 8Q0575 or 3044)	Model 03R
Model 03R	Type 1 (3040 or 3041)	Model 01R
	Type 2 (3043)	Model 02R
Model 11L	Type 1 (3040 or 3041)	Model 11R
	Type 2 (3043)	Model 12R
	Type 3 (RPQ 8Q0575 or 3044)	Model 13R
Model 11R	Type 3 (RPQ 8Q0575 or 3044)	Model 13R
Model 12R	Type 3 (RPQ 8Q0575 or 3044)	Model 13R
Model 13R	Type 1 (3040 or 3041)	Model 11R
	Type 2 (3043)	Model 12R
Model 51R	Type 3 (RPQ 8Q0575 or 3044)	Model 53R
Model 52R	Type 3 (RPQ 8Q0575 or 3044)	Model 53R
Model 61R	Type 3 (RPQ 8Q0575 or 3044)	Model 63R
Model 62R	Type 3 (RPQ 8Q0575 or 3044)	Model 63R

101: Host Attachment

Response:

1 = BSC
2 = SDLC and/or X.21 Nonswitched
3 = X.25
4 = Local Non-SNA
5 = Local SNA
6 = X.21 Switched
7 = Token-Ring Network.

Notes:

1. To use the Token-Ring 3270 Gateway feature, you must respond with either 2 or 5.
2. 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.

Planner: *The following information is needed to complete step 2 of the procedure printed on the divider page labeled "Microcode Customization Planning." Return to this divider page and see step 2 to determine the next worksheet you need to fill out.*

104: Controller Address

Response: The two-digit controller address.

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 6-7 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 also.

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

For Local Non-SNA: 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 control unit. 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 Local SNA: This controller address represents the I/O address of the SNA physical unit.

For Token-Ring 3270 Gateway: 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		
EBCDIC	**ASCII**	**Controller Address**
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 Local SNA without the Token-Ring 3270 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: If this response is 00, the response to question 116 must be other than zero. If this response is nonzero, the response to question 116 must be 0.

For the Token-Ring 3270 Gateway: The upper limit address indicates the range of consecutive subchannel addresses (for local models) or SDLC station addresses (for remote models) assigned to represent the I/O address of Token-Ring Downstream Physical Units (DSPUs). You must define one address for each "intelligent" workstation and 3174 Establishment Controller attached to the ring communicating through this gateway. You must also define an address for the controller you are customizing. For local models, these addresses must be defined contiguously at the host access method.

As an example: You have a Token-Ring Network with 40 DSPUs. 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 upper limit add the number of devices (in hexadecimal). There are 40 devices (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)
```

Note that these responses are all hexadecimal characters.

The number of DSPUs defined dictates the amount of additional storage required. The "Storage Planning Procedure" on page 3-3 will help you determine the amount of additional storage you will need to support the number of DSPUs defined. (Table 3-2 on page 3-4 contains these storage requirements.)

Note: If your response is 00, or if your responses to questions 104 and 105 match, the Token-Ring Gateway panels will not appear during the Configure procedure.

Your response to question 105, minus your response to question 104, cannot be greater than `X'8C'` (140 decimal), which is the maximum number of DSPUs that can be supported.

106: Token-Ring Network Address 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: Twelve-character hexadecimal 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.

Notes:

1. A response of all zeros will cause the Token-Ring adapter to operate with the universal address.
2. 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 will expect to be connected by way of telephone lines.
3. The response to this question cannot be the same as the response to question 107.

Warning: 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, the 3174, as well as the gateway, will have to be recustomized with the new address.

Ask your network planner for this address.

107: Token-Ring Network Address of the Gateway Controller

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 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.

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 will expect 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.

Ask your network planner for this address.

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) Configuration Level

Response:

0 = No MLT	3 = MLT Level 3
1 = MLT Level 1	4 = MLT Level 4
2 = MLT Level 2	5 = MLT Level 5.

The default response is 0.

Notes:

1. A response of 2 may require that additional storage be provided.
2. A response of 3 or higher will require that additional storage be provided and is not supported on small-cluster controllers.
3. If you have ASCII display stations with attached printers, you must specify a nonzero response for this question (110).

"Determining the Level of MLT Support" on page 6-12 is a procedure that will help you determine which MLT level you will require. Perform this procedure now so you can determine the response you should specify for this configuration question. The "Storage Planning Procedure" on page 3-3 helps you to determine if you will require any additional storage to support the MLT level you have chosen. (Table 3-1 on page 3-4 contains these storage requirements.)

A nonzero response to this question configures control unit terminal (CUT) display stations to have the ability to interact with multiple host sessions. *The host sessions may be connected to a single IBM 3270 host or to one or more ASCII hosts.* For access to multiple sessions of the IBM 3270 host, port assignment must be performed (question 116). For access to ASCII host sessions, the controller must have an Asynchronous Emulation Adapter (AEA) and the AEA Configure planning procedure must be performed.

The minimum level of MLT support that should be selected for the controller is determined by the following:

- Number of CUT display stations using the MLT function
- Screen size of the CUT display stations using the MLT function
- Number of host sessions (session limit) on each CUT display station (a maximum of five host sessions is permitted)
- Whether the display stations using the MLT function have extended attribute buffers (EABs)
- Whether the display stations using the MLT function are attached through a 7232 Dual Controller Terminal Multiplexer.

Determining the Level of MLT Support

To determine what level of support you should define, locate and fill in "Worksheet 23—Multiple Logical Terminals" on page A-25.

Step 1 In the Device Type/Screen Size column, specify the device attached to that controller port (for example, DFT, printer, or CUT). If the device is a CUT display station, include the screen size (for example, 24 × 80).

Note: If Feature 6 will be used on a CUT display station (for example, on a 3180 Model 6) and the display station user will be using MLT **and** changing the screen size, you must specify the largest screen size (for storage purposes).

Step 2 In the Number of Sessions column, specify the number of host sessions (3270 and ASCII) for the listed devices. *Printers have a maximum of 1; DFTs and CUTs, a maximum of 5.*

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

Step 3 In the 7232? column, specify whether the device is attached through a 7232 Dual Controller Terminal Multiplexer. *Specify a "Y" or "N" (Yes or No).*

Step 4 In the EAB? column, specify whether the CUT display stations have extended attribute buffers (EABs). *Specify a "Y" or "N" (Yes or No).*

Step 5 When you have completed filling in the preceding columns on the worksheet, you use Table 6-3 to determine how much storage should be reserved for each listed device. *Write in the amount of storage required for each device in the MLT Storage Required column.*

Table 6-3. MLT Storage Specification. Values for storage requirements are in KB (1024 bytes).

Device Type/ Screen Size	Number of Sessions									
	1		2		3		4		5	
	Attached through a 7232?									
	N	Y	N	Y	N	Y	N	Y	N	Y
Printer	0	0	0	0	0	0	0	0	0	0
DFT	0	0	0	0	0	0	0	0	0	0
CUT/24X80 with EAB	0	4	5	9	10	14	15	19	20	24
CUT/24X80	0	2	3	5	6	8	9	11	12	14
CUT/32X80 with EAB	0	8	9	17	18	26	27	35	36	44
CUT/43X80 with EAB										
CUT/27X132 with EAB										
CUT/32X80	0	4	5	9	10	14	15	19	20	24
CUT/43X80										
CUT/27X132										

Note: Add 1KB for every port assignment that has an ASCII display with an attached printer.

Step *6* 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 in the total MLT storage amount required on the line at the bottom of the MLT Storage Required column.*

Step *7* Using the total calculated amount of MLT storage required and *considering future expansion,* determine which level of MLT support you should select.

If the total storage required is	Select MLT level
64KB or less	1
128KB or less	2
416KB or less	3
864KB or less	4
1408KB or less	5

An example of a completed MLT Worksheet is shown in Figure 6-1.

Controller Port Number	Device Type/ Screen Size	Number of Sessions	7232? Y/N	EAB? Y/N	MLT Storage Required
26-00	CUT/24 X 80	2	Y	N	5
26-01	3290 (DFT)	3	Y	N	0
26-02	CUT/24 X 80	2	Y	N	5
26-03	CUT/43 X 80	4	Y	Y	35
26-04	CUT/32 X 80	3	Y	N	14
26-05	CUT/27 X 132	2	Y	N	9
26-06	CUT/24 X 80	4	Y	N	11
26-07	CUT/24 X 80	4	Y	N	11
			Total MLT Storage Required		90

Figure 6-1. An Example of Calculating the Total MLT Amount

In this example, 90KB 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 (416KB) or higher.

MLT-Related Considerations

- To use a 7232 Dual Controller Terminal Multiplexer for switching between controllers, you must specify a response other than zero to this question.
- If the response to this question is other than zero, the response to question 116 must also be other than zero.
- Small-cluster controllers cannot have a response of 3 or higher because of storage constraints.
- See question 125 for information on disabling the background alarm for the background sessions of CUT displays using the MLT function.
- For information on port addressing of the Multiple Logical Terminals (MLTs), see Chapter 7, "Planning for Port Assignment."

116: Individual Port Assignment

Response:

0 = All addresses are automatically assigned.
1 = You assign the number of addresses per port, and the controller automatically assigns the individual addresses.
2 = You assign the individual addresses.

The default response is 0.

If you specify 0, then 32 addresses are automatically assigned on large-cluster controllers; or 16 addresses are assigned on medium-cluster controllers; or eight addresses are assigned on small-cluster controllers.

Enter a 1 or 2 if you:

- Answered question 110 with a nonzero response.
- Plan to assign port addresses on a port-by-port basis.
- Plan to have ASCII devices access 3270 hosts (Asynchronous Emulation Adapter must be present).
- Plan to use distributed function terminals (DFTs) with multiple interactive screens. (The 3290 Information Panel and the 3270 Personal Computer are some of the DFTs with MIS capability.)
- Plan to use a 7232 Dual Controller Terminal Multiplexer with printers, DFTs, or Programmed Symbol Set (PSS) display stations.

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 question 116 is responded to with a 1 or 2. Chapter 7, "Planning for Port Assignment" contains the planning information you need to fill out the worksheet for this panel.

118: Port Address

This panel appears on the screen after the 117 panel. It displays the assigned port addresses in hexadecimal. The customizer cannot enter information on this panel.

121: Keyboard Language

Planner: *You **must** respond with a 01 (the default) if you are configuring for the Asynchronous Emulation Adapter (AEA).*

*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 (Country Extended Code Page) languages in Table 6-5 on page 6-16 when responding to question 121.*

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

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

Table 6-4. Keyboard Languages Supported

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

[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 on BSC, local SNA, and local non-SNA only.
[4] Available on SDLC and X.25 only.
[5] Regional Office for Eastern and Central Europe.

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

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 will result 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 6-5 if you plan to respond to question 123 with a 1.
2. See Chapter 8, "Planning for Country Extended Code Page," for the supported devices.

The languages supported by CECP are listed in Table 6-5. Beside each language name is the 2-digit response that is used when responding to "121: Keyboard Language."

Table 6-5. CECP Languages Supported

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

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

125: Miscellaneous Feature Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 00000000.

Specify digits 1–3 and 5–8 as either a 0 or 1. Specify the default (0) for digit 4. Digits are numbered from left to right.

Digit	Description
1	Dual-Function Clear Key
2	Unsupported Control Code Translate
3	Clicker Option
4	Reserved
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.

Note: Specifying this digit as 1 will cause 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 will be 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 will clear the PROG 402 from the screen. Also, an Erase Write or Erase Write Alternate command from the host application will clear 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 - Reserved Digit:

The fourth digit is reserved and defaults to 0.

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).

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 will have 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) has been responded to with a 1.

Digit 8 - Deferred Keystroking - Remote SNA:

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

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

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 13—128: RTM."

Turn to Chapter 9, "Planning for Response Time Monitor (RTM)" 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 will be used.

Base keyboards 8K0808 and 8K0932 are mutually exclusive. If you select Base keyboard 8K0808 or 8K0932, all standard typewriter keyboards are replaced. This affects keyboards that emulate a standard typewriter keyboard. If the 3174 Establishment Controller is customized for RPQ 8K0808 Base keyboards, 3270 terminal emulation will not work for ASCII display stations. If you select Base keyboard 8K1158, all standard APL keyboards are replaced.

To determine which keyboards you have, refer to Table 6-6, which lists the microcode RPQs associated with the different keyboards. For visual identification of keyboards 8K0808, 8K0932, 8K1038, or 8K1158, refer to *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) will result in the PF keys being operational in the lower shift position.

Table 6-6. 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 15, "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 on page 6-21.

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 15, "Planning to Modify Keyboards," for directions for defining a modified layout.

Enter a 1 in the response field for the ID(s) that you either plan to define or have already defined. This will configure 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 6-21.

These responses specify the type of keypad to be used with the standard keyboard layout(s) 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*.

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).

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.

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 *3174 Character Set Reference*.

Note: Your response must be A if your response to question 121 was 02 (English (U.S.) ASCII-7), 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 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, access to the Home function is changed; the Home key must be pressed twice to return the cursor to Home. 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 will affect all Base keyboards (for example, 3278 or 3279 keyboards) and all keyboards emulating 3278 type keyboards. It will 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 the:

- 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.

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 will enable 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.
- 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.

178: 7232 Dual Controller Terminal Multiplexer Switching

Planner: *Respond to this question only if you will be attaching devices that support a Programmed Symbols Set (PSS) through a 7232.*

To customize for 7232 Dual Controller Terminal Multiplexer support, you must have responded to question 110 (MLT) with a nonzero value. If possible, PSS devices should not be attached to the 3174 controller through a 7232.

Response:

0 = Switching permitted on all devices (no PSS support on PSS devices attached through the 7232)
1 = Switching permitted only on devices without PSS (PSS is supported on devices attached through the 7232).

The default (0) allows switching between controllers at the various terminals, provided that the necessary addressing is done through Port Assignment (see question "116: Individual Port Assignment" on page 6-14).

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 will be shared for both local copy and host printing).

For more information on local copy, see Chapter 14, "Planning to Define the Printer Authorization Matrix (PAM)."

215: Physical Unit Identification

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 control unit to the host in response to an SDLC XID command. The PUID is required if the 3174 will operate on a switched data link.

220: Alert 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 only
3 = Alert function with operator-generated alert message capability from all ports.[1]

The default response is 0.

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 through the Network Communication Control Facility (NCCF) 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.

222: Support of Command Retry

Planner: *Configuration questions 222, 223, 224, and 225 pertain to 3174 Models 1L and 11L only. If you are planning for a remote 3174 model, continue with question 310.*

Table 6-7 on page 6-29 lists the customizing parameters and host systems for which the 3174 Model 1L and 11L are supported. The information in this table applies to SNA and non-SNA attachments. Refer to Table 6-7 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.

---

[1] Distributed function terminals cannot issue an operator-generated alert message.

The following information explains the contents of Table 6-7.

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 two different modes:

- Data Chained Interlocked (DCI) – Interlocked single tag
- High-Speed Transfer (HST) – Interlocked double tag.

High-Speed Transfer is more likely to achieve the 1.25-megabyte data transfer rate than DCI.

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 6-7. 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 6-28.

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 feature. Any response entered for this question will have no effect when the gateway feature is used.

224: Mode of Data Transfer

Response:

0 = Interlocked mode; normal data transfer
2 = Interlocked mode; high-speed data transfer.

The default response is 2.

See the "Planner" note on page 6-28.

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

Response applicable only for byte multiplexer channel operation:

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.

The default response is 4.

See the "Planner" note on page 6-28.

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 out*

- *Worksheet 2, 3, 4, 5, or 8, continue responding to the following configuration questions that appear on your worksheet.*
- *"Worksheet 6—Local (Non-SNA)," return to the divider page labeled "Microcode Customization Planning" and see step 4 to determine the next worksheet to fill out.*
- *"Worksheet 7—Local (SNA)," return to the divider page labeled "Microcode Customization Planning" and see step 3 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 5-7.

310: Connect-Data-Set-to-Line (CDSTL) Operation

Response:

0 = Operation on a nonswitched line, **or**
Operation on a switched line in the U.S. 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
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. A response of 1 is not valid for Models 11L, 11R, 12R, 13R, 61R, 62R, 63R, 91R, and 92R.

To respond to this question, you need to know:

- Whether the modem in your installation is operating in *duplex*[2] 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 6-8 to determine your response.

Table 6-8. 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 317 with a 1 and respond to question 340 with a 0. 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 control units 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 modem supports half-duplex RTS protocol on the secondary facility and supports full-duplex RTS protocol on the primary facility.

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 remote models using BSC or the 3270 Token-Ring Network Gateway feature.)

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[2] Synonymous with *full-duplex*.

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 may be generated, one for full-speed operation and one for half-speed operation. (See the Copy procedure in the *3174 Utilities Guide*, GA27-3853.) 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. The responses entered on this panel customize the microcode for X.25 support. Chapter 10, "Planning for X.25" contains the planning information needed to fill out the X.25 Options worksheet.

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 will 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 select your response.

Table 6-9. Response Selection For Question 340

Primary Modem Operation	**Secondary Modem Operation**	**Network Type**	**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[2]	None
Duplex	Half-duplex	SDLC or BSC	1	Backup Control Disk[1]

[1] On the backup Control disk, respond to question 340 with a 0 and respond to question 317 with a 1. Responses to all other customization questions should be the same on both Control disks.

[2] 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.

Planner: *If you are filling out*

- *Worksheet 3, 4, 5, or 8, continue responding to the following configuration questions that appear on your worksheet.*
- *"Worksheet 2—BSC," return to the divider page labeled "Microcode Customization Planning" and 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 5-7.

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 default response is 00000000. Digits are numbered from left to right.

Digit	Description
1	Direct Key
2	Dial Key
3	Local, Communicate Key
4	Immediate Disconnect Key
5	Extension Key
6	Delayed Disconnect Key
7	DCE Supported for Direct Calls
8	DCE Supported for Address Calls

If you are not using the X.21 Switched feature, use the default (00000000).

The response to this question defines what X.21 keyboard options can be used on the terminals attached to any ports other than port 0. Each digit allows or disallows one of the keyboard options.

Local, Communicate Key:

The third digit determines whether the controller can disconnect from the data communication equipment (DCE).

Extension Key:

The fifth digit allows access to all other X.21 keys, and so it must be specified as 1 if the other keys are to be used.

Disconnect Key:

The fourth digit determines which port(s) may use the Disconnect key and the sixth digit determines whether the operation of the Disconnect key will be immediate or delayed. The choices are:

Digits		
4	**6**	**Result:**
0	0	Pressing the Disconnect key immediately performs the disconnect operation on port 0 only.
1	0	Pressing the Disconnect key immediately performs the disconnect operation on *all* ports.
0	1	The user must press the Disconnect key twice in order to disconnect on port 0 only.
1	1	The user must press the Disconnect key twice in order to disconnect on *all* ports.

Access to Direct and Dial keys:

Port 0 always has access to all the X.21 options except for the Direct and Dial keys (first and second digits). Port 0 access to Direct and Dial depends on the status of the DCE as defined in the seventh digit (direct calls) and in the eighth digit (address calls):

- **DCE Supported for Direct Calls:** If you specify the seventh digit as 1, port 0 supports the Direct key.
- **DCE Supported for Address Calls:** If you specify the eighth digit as 1, port 0 supports the Dial key.
- If you specify both the seventh and eighth digits as 1, port 0 supports both the Direct and Dial keys.

To use the X.21 feature, you must specify either or both of the seventh and eighth digits as 1, depending on which DCE support is used.

Example: 00011001 indicates that the Immediate Disconnect key (fourth digit specified as 1) and the Extension key (fifth digit specified as 1) can be used on all terminals attached to the 3174. All the terminals support the DCE for address calls (eighth digit specified as 1). The Extension key (fifth digit) is specified as 1 so that the other X.21 keys can be used.

365: X.21 Data Transfer Delay

Planner: *Respond to this question only if your response to question 100 was one of the following: 2R, 12R, 52R, 62R, 82R, or 92R. For all other models, respond with the default (0).*

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 out*

- *Worksheet 4, 5, or 8, continue responding to the following configuration questions that appear on your worksheet.*
- *"Worksheet 3—X.25," return to the divider page labeled "Microcode Customization Planning" and see step 3 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 5-7.

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.

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).

Planner: *If you are filling out*

- *Worksheet 8, continue responding to the following configuration questions.*
- *"Worksheet 4—SDLC" or "Worksheet 5—X.21 Switched," return to the divider page labeled "Microcode Customization Planning" and see step 3 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 5-7.

380: Maximum Receive I-Frame Size

Planner: *The remaining configuration questions in this chapter pertain to the Token-Ring Network. If you need additional information to answer these questions, see your Token-Ring Network documentation.*

Response: Four numeric characters.

The default response is 2042.

- 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 4105 bytes.

Where necessary, use a leading zero (0265 for 265).

Notes:

1. The response to this question is dependent upon your gateway and ring configuration. For additional information, see Chapter 13, "Planning the Token-Ring Network 3270 Gateway."
2. If your gateway is the 3174 Token-Ring Network 3270 Gateway feature, the response to this question should match the F-field response in question 941. (See Chapter 13 for information on question 941.)
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 I-frame size should include the length of the transmission header (TH) and response header (RH). For example, if the maximum length of a request unit (RU) segment is 1024, the I-frame size specified should be 1033 (1024 + 9 for the TH and RH).

381: Token-Ring Network Maximum In

Response: One numeric character.

The default response is 1; a valid response ranges from 1 to 7.

This field specifies the maximum number of link level I-frames that the 3174 receives before transmitting an acknowledgment and may also be referred to as the "receive window size."

Notes:

1. The response to this question is dependent upon your gateway and ring configuration.
2. If your gateway is the 3174 Token-Ring Network 3270 Gateway feature, the response to this question should be equal to or less than the W-field Maximum Out (Transmit Window Size) specified in question 941. (See Chapter 13 for information on question 941.)

Relationship between Questions 381 and 941

Token-Ring Network performance is enhanced by the values assigned to the Transmit Window Size (question 941) and the Receive Window Size (question 381). (See Chapter 13 for information on question 941.)

It is strongly recommended that you set 381 to 1. This ensures that each received frame is acknowledged. (Very little congestion is added to Token-Ring Network traffic by the acknowledgment.)

The W-field (Transmit Window Size) of question 941 should be set greater than 381. A value of 2 or 3 is recommended for single ring Token-Ring Networks. If bridges are included, a value of 4 should be considered. These values will permit uninterrupted transmission by eliminating wait for acknowledgments and will keep buffer resources in the gateway from being depleted.

Warning: Never set the W-field of question 941 to less than question 381's response. This causes a wait for acknowledgments and, thus, degraded performance.

382: Maximum Transmission 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 is dependent upon 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).

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.

Planner: *This is the end of the regular configuration questions. Return to the divider page labeled "Microcode Customization Planning" and see step 3 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 5-7.

Chapter 7. Planning for Port Assignment

Getting Ready to Plan for Port Assignment

The information in this chapter will help you to complete step 4 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start,you will need the following:

- "Worksheet 12—117: Port Assignment" on page A-14
- Information about the terminals to be attached to the controller
- Information about which terminal is assigned to which port.

Which Response to Question 116 Should You Specify?

Individual port addressing saves host addresses because you define only those ports that you will use. 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.

Planner: *If you are planning to allow communication with ASCII devices through the Asynchronous Emulation Adapter (AEA), it is strongly recommended that you plan the AEA configuration before planning for Port Assignment. For additional information, see Chapter 12, "Planning for the Asynchronous Emulation Adapter."*

There are three possible responses to question 116. These responses are discussed on the following page. If you need help choosing a response, see "Port Assignment Considerations" on page 7-5.

A Response of 0

If your response to question 116 is 0, you do not need to plan for Port Assignment. Instead, the customizing program automatically assigns addresses for each port of the controller, even if all the ports will not have display stations or printers connected to them. When operating in non-SNA, unused addresses take up channel address space.

Note: You cannot respond with a zero if you are planning to customize for

- DFTs using the multiple interactive sessions capability (MIS)
- CUTs using the Multiple Logical Terminals function
- ASCII terminals accessing the 3270 host.

Proceed to "A Response of 1" and "A Response of 2" for information on how to respond to question 116 and how to plan for port assignment of these displays.

A Response of 1

If you specify 116=1, you define the number of host addresses per port and let the customizing program assign the addresses.

The customizing program assigns the addresses in ascending order. First, each port you select to use receives its *primary address.* Then, those ports assigned DFTs that are using the multiple interactive sessions capability or CUTs that are using the MLT function receive secondary addresses. The secondary addresses begin where the primary addresses leave off. For example, if addresses 2 through 15 are primary addresses, the first secondary address assigned will be 16.

A Response of 2

If you specify 116=2, you assign host addresses for each port of the 3174 Establishment Controller. You can assign the addresses in any order, skipping addresses between ports.

First, you assign the *primary address.* Then, for those ports assigned DFTs that are using the multiple interactive sessions capability or CUTs that are using the MLT function, you assign secondary addresses. The secondary addresses begin where the primary addresses leave off. For example, if you assign addresses 2 through 15 as primary addresses, the first secondary address you can assign will be 16.

Port Assignment Considerations

For DFT

The **multiple interactive sessions capability** 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 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

The **Multiple Logical Terminals (MLT) function** allows 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 "Worksheet 23—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 AEA

If you are planning to use the AEA in your configuration, you need to be aware of and consider the following:

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 from the Connection Menu.
>
> 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 will be allowed to communicate with the 3270 host.

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 will be able to connect to the 3270 host only on the logical terminals for which a 3270 host address has been assigned.

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 22—AEA Default Destination," a display user will not be 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 LT1, LT2, and LT3 (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 LT1, LT2, and LT3 (see Figure 7-1 on page 7-7). Skipping addresses on a port is not permitted.

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).

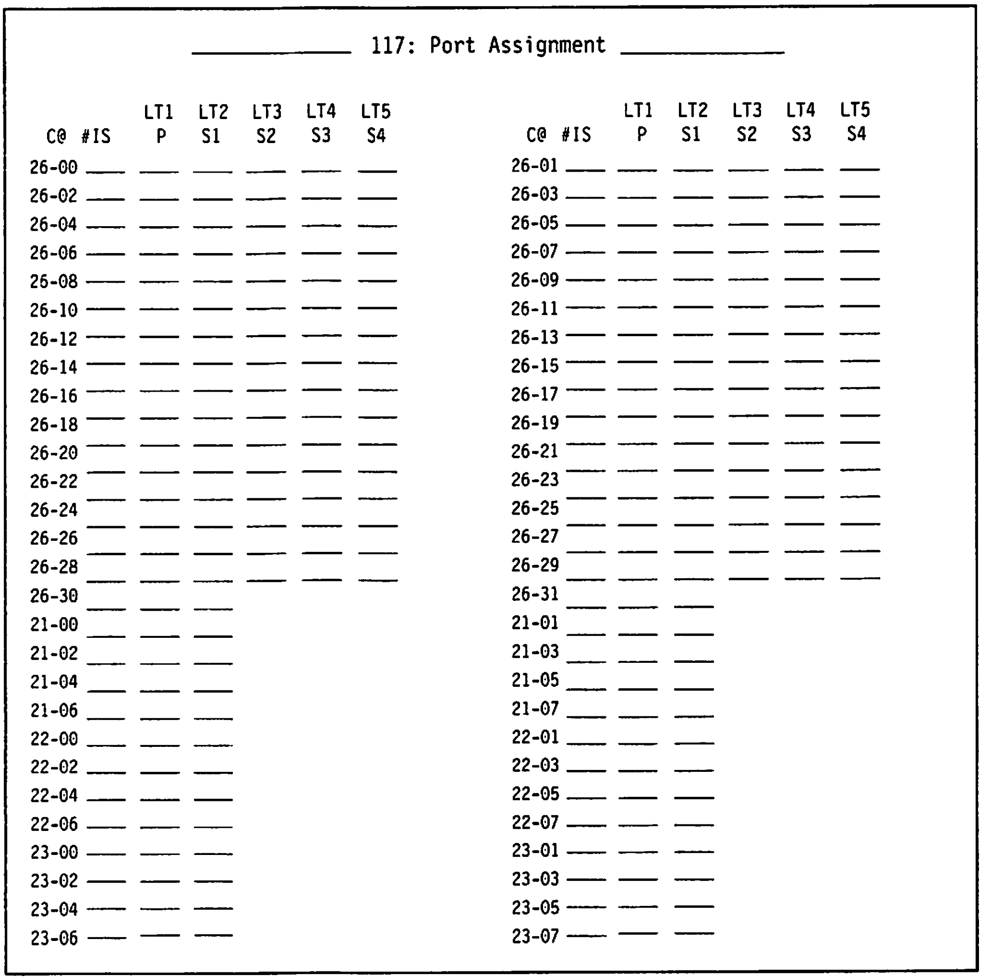
If you are responsible for assigning terminals to ports, you can record the port assignment data for the site planner on the Cabling Worksheets after you have finished planning to customize for individual port assignment. These worksheets are included in *3174 Site Planning*. These worksheets are designed 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 12—117: Port Assignment" (Figure 7-1). On the worksheet, you assign the number of logical terminals per port connection. The customizer will use the completed worksheet to identify these assignments in the microcode.

There are two procedures for filling out this worksheet. If you:

- Specified that 116 = 1, use the procedure on page 7-9.
- Specified that 116 = 2, use the procedure on page 7-11.



___ 117: Port Assignment ___

		LT1	LT2	LT3	LT4	LT5			LT1	LT2	LT3	LT4	LT5
C@	#IS	P	S1	S2	S3	S4	C@	#IS	P	S1	S2	S3	S4
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	___	___	___			
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	___	___	___			

Figure 7-1. An Example of Worksheet 12—117: Port Assignment

The columns on this worksheet are described below.

C@	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 prefixes "21," "22," and "23" indicate direct or indirect connection to the Asynchronous Emulation Adapter (AEA) cards, identified by Hardware Groups 21, 22, and 23.
#IS	This column defines the number of 3270 host addresses to be assigned to each port. For a DFT, or CUT display using the MLT function, this number must correspond to the number of logical terminals requiring connections to the 3270 host. For any other type of terminal (including AEA attached terminals), the number is either 0, 1, or 2 (2 is for AEA displays with attached printers). The default for port 26-00 is a 1; the default for ports 26-01 through 23-07 is 0. The default can be changed to a number between 1 and 5 for all 26-xx ports, but can be changed only to a 1 or 2 for the 21-xx, 22-xx, and 23-xx ports.
LT1/P	This column defines the primary address of the display station or printer assigned to the port. *It corresponds to the "LT1" response column on "Worksheet 22—AEA Default Destination."*
LT2—LT5/S1—S4	These columns define the *secondary addresses* for DFTs and CUTs using the MLT function or the printer address for AEA displays with attached printers. The combined total of primary and secondary addresses should equal the number of 3270 host sessions. Use the secondary addresses for ports 26-00 through 26-31 when assigning a port for a Host Addressable Printer. (In the Operator Information Area on the terminal's screen, the LT numbers will jump from LT1 to LT3 because the Host Addressable Printer is assigned LT2.) Secondary addresses for ports 21-00 through 23-07 are for printers attached to displays. *They correspond to the "LT2" through "LT5" response columns on "Worksheet 22—AEA Default Destination."*

Completing Worksheet 12—117: Port Assignment When 116 = 1

If your response to question 116 is 1, you select the ports you will use and define the number of addresses per port. The 3174 customizing program assigns the primary and secondary addresses automatically.

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 12—117: Port Assignment" on page A-14. You will partially complete this worksheet.

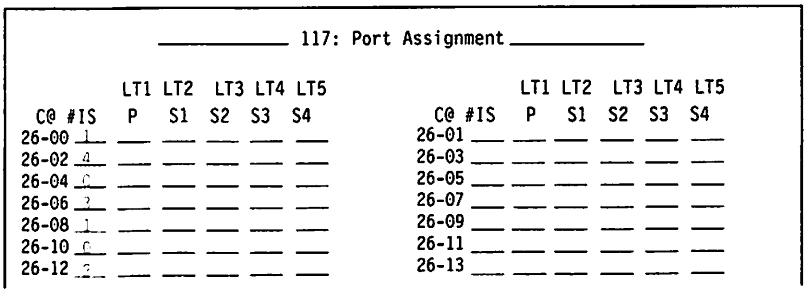
Step ***2*** In the #IS column, write the number of addresses (0 to 5) next to each port to which you want to assign addresses. Write a number next to each port. If you do not want to use a port for a 3270 host session, write a 0.

Note: This number must represent the total number of 3270 host sessions desired to support the CUT or DFT.

- For Models 51R, 52R, 61R, and 62R, you can assign terminals only to ports 26-00 through 26-15 and to ports 21-00 through 21-07.
- For Models 53R, and 63R, you can assign terminals only to ports 26-00 through 26-15.
- For Models 81R, 82R, 91R, and 92R, you can assign terminals only to ports 26-00 through 26-07.

You can assign a printer or DFT to port 26-00, but if you do you cannot request a local copy to the printer or recustomize. To recustomize, you will be required to replace the DFT or printer with a CUT display.

In the following example, DFTs or CUTs (with MLT support) are assigned to ports 26-02, 26-06, and 26-12. Ports with an entry of zero in the #IS column will not be used for 3270 host sessions.



________ 117: Port Assignment ________

		LT1	LT2	LT3	LT4	LT5			LT1	LT2	LT3	LT4	LT5
C@	#IS	P	S1	S2	S3	S4	C@	#IS	P	S1	S2	S3	S4
26-00	1						26-01						
26-02	4						26-03						
26-04	0						26-05						
26-06	3						26-07						
26-08	1						26-09						
26-10	0						26-11						
26-12	2						26-13						

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 208 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 "Worksheet 12—117: Port Assignment."

Planner: *You have completed "Worksheet 12—117: Port Assignment."*

Return to the divider page labeled "Microcode Customization Planning" and see step 4 to determine if there are additional worksheets you need to fill out before going to 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 5-7.

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 Worksheet 12—117: Port Assignment When 116 = 2

If your response to question 116 is 2, you assign (in decimal values) the primary and secondary addresses 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.

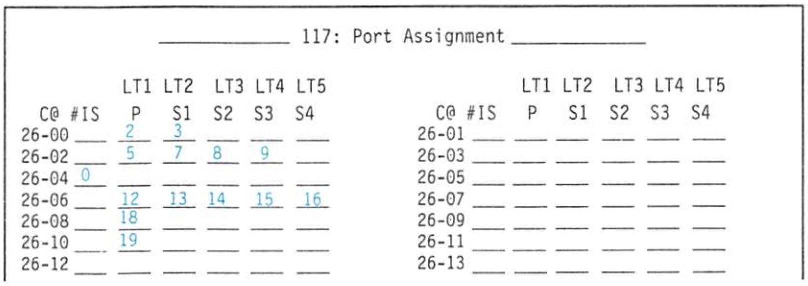
Step *1* Locate and make a copy of "Worksheet 12—117: Port Assignment" on page A-14. You will partially complete this worksheet.

Step *2* Under the address column headings, write the addresses in decimal values. When you assign multiple addresses to a port, assign them consecutively: LT1/P, LT2/S1, LT3/S2, LT4/S3, LT5/S4. You can skip addresses between ports, or skip ports, but you cannot skip over a logical terminal: for example, assign LT1/P, LT3/S2, LT4/S3, but not LT2/S1. The logical terminal numbers themselves do not need to be sequential, but be careful not to repeat logical terminals. For example, 7, 9, 5, 15 is an acceptable sequence, but not 7, 9, 5, 9. If there is no address to specify, leave the field empty on the worksheet.

- For Models 51R, 52R, 61R, and 62R, you can assign terminals only to ports 26-00 through 26-15, and 21-00 through 21-07.
- For Models 53R, and 63R, you can assign terminals only to ports 26-00 through 26-15.
- For Models 81R, 82R, 91R, and 92R, you can assign terminals only to ports 26-00 through 26-07.

You can assign a printer or DFT to port 26-00, but if you do you cannot request a local copy to the printer or recustomize. To recustomize, you will be required to replace the DFT or printer with a CUT display.

In the following example, DFTs or CUTs (with MLT support) are assigned to ports 26-00, 26-02, and 26-06. No terminal is assigned to port 26-04 for access to a 3270 host session.



```
            ___________ 117: Port Assignment ___________

             LT1 LT2 LT3 LT4 LT5                  LT1 LT2 LT3 LT4 LT5
  C@ #IS      P   S1  S2  S3  S4       C@ #IS      P   S1  S2  S3  S4
26-00 ___   _2_ _3_ ___ ___ ___      26-01 ___ ___ ___ ___ ___ ___
26-02 ___   _5_ _7_ _8_ _9_ ___      26-03 ___ ___ ___ ___ ___ ___
26-04 _0_   ___ ___ ___ ___ ___      26-05 ___ ___ ___ ___ ___ ___
26-06 ___   _12 _13 _14 _15 _16      26-07 ___ ___ ___ ___ ___ ___
26-08 ___   _18 ___ ___ ___ ___      26-09 ___ ___ ___ ___ ___ ___
26-10 ___   _19 ___ ___ ___ ___      26-11 ___ ___ ___ ___ ___ ___
26-12 ___   ___ ___ ___ ___ ___      26-13 ___ ___ ___ ___ ___ ___
```

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 208 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 are assigned addresses on "Worksheet 12—117: Port Assignment."

Planner: You have completed "Worksheet 12—117: Port Assignment."

Return to the divider page labeled "Microcode Customization Planning" and see step 4 to determine if there are additional worksheets you need to fill out before going to 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 5-7.

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 12—117: Port Assignment."

Change in 116		
Was	**Now**	**Change to Worksheet**
116=0	116=1	Fill in the #IS column.
116=0	116=2	Fill in the address columns (LT1/P, LT2/S1, ...) with decimal values.
116=1	116=0	None. The customizing program automatically assigns new addresses.
116=1	116=2	In address columns (LT1/P, LT2/S1, ...), you can add new addresses or you can delete or replace the previous assigned addresses (use decimal values).
116=2	116=0	None. The customizing program automatically assigns new addresses.
116=2	116=1	Fill in the #IS columns with new values.

Chapter 8. Planning for Country Extended Code Page

An Overview of Country Extended Code Page (CECP)

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 6-5 on page 6-16 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.

Prior to CECP, communication could be conducted only in the character set of a given language. For example, a keyboard customized for German was restricted to only the characters and punctuation necessary for German. The flexibility of using characters from another language—French, for example—was not feasible.

With CECP, a German keyboard can be modified using the Keyboard Definition Utility (KDU), to contain the same characters as a French keyboard. 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 6-16) to indicate support or nonsupport of CECP.

Warning: Installation of CECP may cause a loss of data integrity in databases and applications. Therefore, please read "System Considerations" on page 8-7 in this book before customizing for CECP.

To understand CECP, it will be helpful to learn about the following:

- 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 have 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 which 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.

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"	ı	Superscript 1	^{1}
Florin symbol	ƒ	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 will not be 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 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.

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+.

System Considerations

Users may need to consider whether host programs will 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 customer's responsibility to ensure that host programs and data bases can accept CECP data. You should be careful of the following:

- Host filters
- Host use of previously defined I/O code points
- Data integrity.

The user may be required to keep track of which data sets will be CECP and which will not.

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 will 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 will be translated to a hyphen. If this data is read back by the host, the original CECP data that corresponded with these I/O code points will be 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 will be the source of the operation and a printer will be the target. If the source is CECP-capable and the target is not, CECP-unique characters will not print properly. For all other combinations of source and target, characters will print correctly.

Chapter 9. Planning for Response Time Monitor (RTM)

Getting Ready to Plan for Response Time Monitor

The information in this chapter will help you to complete step 4 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will need the following:

- "Worksheet 13—128: RTM" on page A-15
- Information from your system programmer to select your responses.

An Overview of Response Time Monitor

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.

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 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 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 will be 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 will still have 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 will still have 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 13—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 will help you fill out "Worksheet 13—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

F1-00000000

B1	☐	☐	☐
	00	01	0
B2	☐	☐	☐
	00	02	0
B3	☐	☐	☐
	00	05	0
B4	☐	☐	☐
	00	10	0

Figure 9-1. An Example of Worksheet 13 — 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. 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.

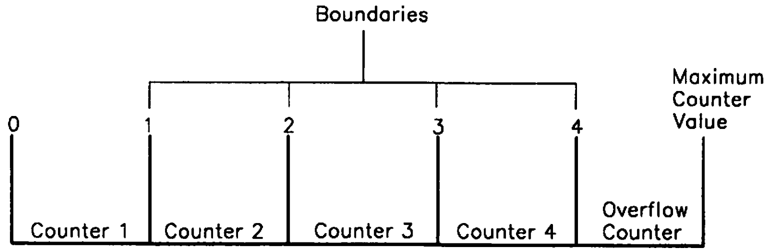


Figure 9-2. Counters and Boundaries

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 will 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 will increase the first counter.

Each response time exceeding 2.1 seconds but less than or equal to 3.2 seconds will increase the second counter.

Each response time exceeding 3.2 seconds but less than or equal to 5.5 seconds will increase the third counter.

Each response time exceeding 5.5 seconds but less than or equal to 7.7 seconds will increase the fourth counter.

Each response time exceeding 7.7 seconds will increase 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 Out Worksheet 13—128: RTM

Step *1* Locate "Worksheet 13—128: RTM" on page A-15.

Step *2* Enter your responses on the worksheet.

- If you want to use the default values (values printed under the boxes) for Version A or B, 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* 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.

Version A is complete once you have specified the boundaries. For Version B, continue with the next step.

Step *4* If you are completing 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 (0) for the status flag field stand, RTM statistics will not be kept for any device unless a host application enables the RTM function.

Planner: *You have completed "Worksheet 13—128: RTM."*

Return to the divider page labeled "Microcode Customization Planning" and see step 4 to determine if there are additional worksheets you need to fill out before going to 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 5-7.

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 13—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, or 5	1 or 2	Fill out Version A of the 128 panel.
1 or 2	3, 4, or 5	Fill out Version B of the 128 panel.
3, 4, or 5	3, 4, or 5	Record the changed responses on Version B of the 128 panel.

Chapter 10. Planning for X.25

Getting Ready to Plan for X.25

The information in this chapter will help you to complete step 3 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will need the following:

- "Worksheet 14—X.25 Options" on page A-16
- The X.25 network subscription.

An Overview

The CCITT recommendation for X.25 involves defining 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.

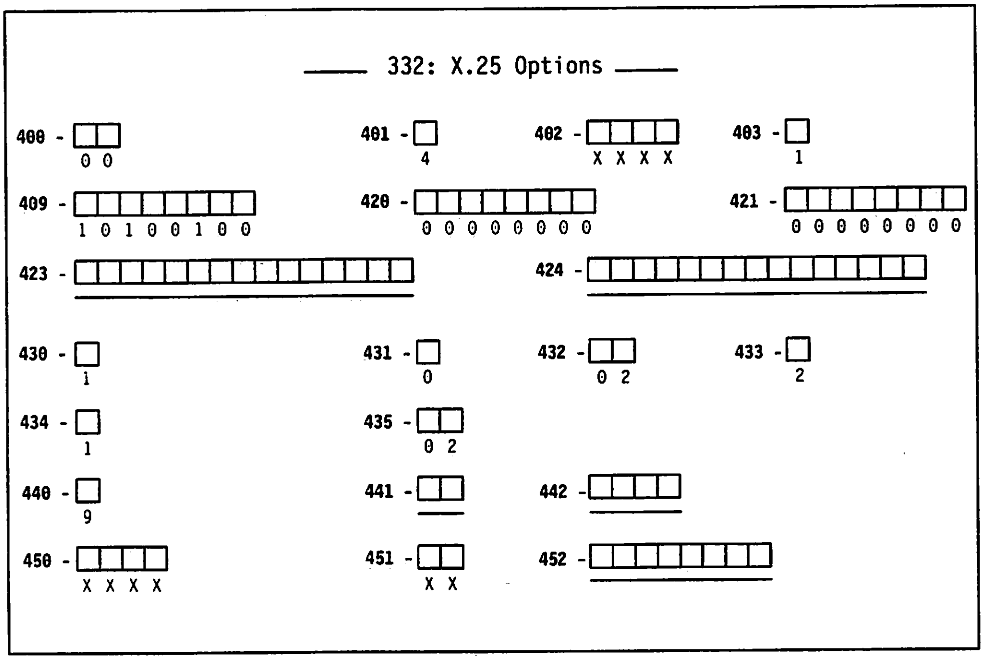
An X.25 network subscription can include optional user facilities. Customizing for X.25 involves defining the unique aspects of your subscription to the X.25 network. You will need a copy of your firm's X.25 network subscription to complete the X.25 worksheet. The 3174 controller supports the following facilities for SVCs and provides customizing questions for them:

- Closed User Group
- Connection Identifier
- Window Size
- 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 you *must* set the sixth digit equal to 0 ("Dial Screen Display").

The X.25 Options Worksheet

If your response to question 101: Host Attachment, is 3 (X.25), you must fill out "Worksheet 14—X.25 Options" (see Figure 10-1).



——— 332: X.25 Options ———

400 - ☐☐ 0 0

401 - ☐ 4

402 - ☐☐☐☐ X X X X

403 - ☐ 1

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 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ _______________

424 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ _______________

430 - ☐ 1

431 - ☐ 0

432 - ☐☐ 0 2

433 - ☐ 2

434 - ☐ 1

435 - ☐☐ 0 2

440 - ☐ 9

441 - ☐☐ __

442 - ☐☐☐☐ ____

450 - ☐☐☐☐ X X X X

451 - ☐☐ X X

452 - ☐☐☐☐☐☐☐☐ ________

Figure 10-1. An Example of Worksheet 14 — X.25 Options

The areas on this worksheet are described below.

Default responses	The microcode will automatically supply 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 questions 423 and 424 (host and 3174 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 14—X.25 Options

Planner: *The following questions appear on "Worksheet 14—X.25 Options." This worksheet is filled out during step 3 of the procedure printed on the divider page labeled "Microcode Customization Planning."*

Locate "Worksheet 14—X.25 Options" on page A-16. Write your responses to the following questions on the worksheet.

400: Network Type

Response:

00 = CCITT-recommended network with announced IBM support, not listed below.
01 = Connection is to the Netherlands DATANET 1.
02 = Connection is to United Kingdom Packet Switched Service (UKPSS)[1] or TELENET.[2]

The default response is 00.

This input field defines the network type supported. If IBM has announced X.25 support for your country's network and it is not one of the networks specified above, use the default (00).

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).

The default response is 4.

This input field indicates the type of circuit the 3174 controller will use. Refer to your subscription information for your response.

A permanent virtual circuit (PVC) gives users the appearance of an actual end-to-end connection, 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.

---

[1] Trademark of British Telecom

[2] Trademark of General Telephone and Electronics (GTE) Telenet Communications Corporation

402: Logical Channel Identifier

Response:

0000 – 4095.

This decimal value is the channel identifier for the circuit specified in question 401. Refer to your subscription information for your channel identifier.

Note: Some networks do not permit logical channel 0.

403: Logical Link Control

Response:

0 = PSH control
1 = QLLC control.

The default response is 1.

This input field specifies the choice of protocols: physical service header (PSH) or qualified logical link control (QLLC). PSH support allows the 3174 to communicate with equipment attaching to the network via the Network Interface Adapter. IBM products with integrated X.25 support use QLLC.

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. Keyboards on distributed function terminals cannot be used for initiating or terminating an X.25 communication. 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 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.

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 on port 0, 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 on port 0 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 on port 0 only.
1 = X.25 keys are supported on all ports (except those with a distributed function terminal 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.

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 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 during a Dial session on a per-call basis.

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 *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 is for TCLS (Throughput Class Negotiation) and 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: 0 through 9.

This field contains the host network data terminating equipment (DTE) address. Enter a maximum of 15 digits for the telephone number. You must respond to this question if:

- 401=2 and the first digit of the response to question 420 is 1, **or**
- 401=3, **or**
- 401=4.

Otherwise, circle the underscore (default) on the worksheet.

Note: If the response to this question does not fill the entire field, leave blanks or underscores wherever you have not written a numeric character.

424: 3174 DTE Address

Response: 0 through 9.

This field contains the local DTE address for the 3174. Enter a maximum of 15 digits for the telephone number. If the first digit of your response to question 421 is 1 and the response to question 401 is 3 or 4, then you must respond to this question. Otherwise, circle the underscore (default) on the worksheet.

Note: If the response to this question does not fill the entire field, leave blanks or underscores wherever you have not written a numeric character.

430: Negotiated Packet Size (NPKT)

Response:

0 = 64-byte packet
1 = 128-byte packet
2 = 256-byte packet
3 = 512-byte packet.

The default response is 1.

These responses define the negotiated packet size facility. This is an optional facility; refer to your subscription information. In question 420 (Incoming Call Options), if the fourth digit is 1, this field sets the size limit to which the 3174 may negotiate when accepting packets. In question 421 (Outgoing Call Options), if the fourth digit is 1, this field sets the requested size limit.

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 for your response. The response to this question will affect your responses to questions 432 and 435.

432: Negotiated Window Size (NWND)

Response:

01 – 07 = Range for modulo 8 (if question 431 equals 0)
01 – 11 = Range for modulo 128 (if question 431 equals 1).

This field is used for the negotiated window size facility. Refer to your network subscription for your response. In question 420 (Incoming Call Options), if the fifth digit is 1, this response sets the size limit to which the 3174 may negotiate when accepting packets. In question 421 (Outgoing Call Options), if the fifth digit is 1, this response sets the limit for the requested size.

433: K-Maximum Out

Response: Maximum number of link level I-frames.

A value of 1 – 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. Your network subscription information will indicate the correct response.

434: Nonstandard Default Packet Size (DPKT)

Response:

0 = 64-byte packet
1 = 128-byte packet
2 = 256-byte packet
3 = 512-byte packet.

The default response is 1.

Note: Although a packet size of 512 bytes can be specified to match the network, the 3174 imposes an upper data limit of 265 bytes for the path information unit (PIU) size.

This field contains the packet size value to which you subscribed in your X.25 network agreement. This value is used to select the 3174 packet size when any of the following conditions applies:

- In question 421 (Outgoing Call Options), the fourth digit is 0 (*not* to include the negotiated packet size facility in the outgoing call packet).
- An incoming call packet does *not* include the negotiated packet size facility.
- Permanent Virtual Circuit (PVC).

An operator can enter this value on a per-call basis, overriding default or customized values.

435: Nonstandard Default Window Size (DWND)

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 packet window size value subscribed to in your X.25 network agreement. This value is used to select the 3174 window size when either of the following conditions applies:

- In question 421 (Outgoing Call Option), the fifth digit is 0 (*not* to include the window size facility in the outgoing call packet).
- An incoming call packet does *not* include the window size facility.

Refer to your network subscription for the value for this field.

440: Throughput Class Negotiation (TCLS)

Response:

3 = 75 bps
4 = 150 bps
5 = 300 bps
6 = 600 bps
7 = 1200 bps
8 = 2400 bps
9 = 4800 bps
A = 9600 bps
B = 19 200 bps
C = 48 000 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 request 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.

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.

452: Connection Identifier Password (CID)

Response: This 8-character password can have numeric characters (0 – 9), alphabetic characters (A – F), or blanks. If the response to this question does not fill the entire field, leave blanks or underscores wherever you have not written a hexadecimal character.

The connection identifier (CID) response is optional unless the sixth digit in questions 420 and 421 is 1. In question 420 (Incoming Call Options), if the sixth digit is 1 (validate the CID on incoming packets), this field is used for the validation. In question 421 (Outgoing Call Options), if the sixth digit is 1 (include the CID in the Call Request packet), this input field supplies the CID. If there is no response for this question, circle the underscore (default) on the worksheet.

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. (For example, hexadecimal characters are required for the NCP Packet Switching Interface [NPSI] SYSGEN.) Check the appropriate host documentation to determine SYSGEN requirements.

Planner: *You have completed "Worksheet 14—X.25 Options."*

Return to the divider page labeled "Microcode Customization Planning" and see step 3 to determine if there are additional worksheets you need to fill out to complete this 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 5-7.

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 14—X.25 Options" on page A-16.

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 14—X.25 Options" (on page 10-5) for instructions on filling out 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 Central Site Change Management

Getting Ready to Plan Central Site Change Management (CSCM)

This chapter consists of additional questions you need to respond to in order to customize your control unit if you plan to use Central Site Change Management (CSCM). If you do not plan to use CSCM, you may leave these questions set to their defaults. The information in this chapter will help you to complete step 3 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will need "Worksheet 24—Common SNA" on page A-26.

Note: Before planning for and answering the questions for Central Site Change Management (CSCM), you should become familiar with the *Central Site Customizing User's Guide*, GA23-0342.

An Overview of CSCM

CSCM offers many advantages over previous configurations. 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 (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.

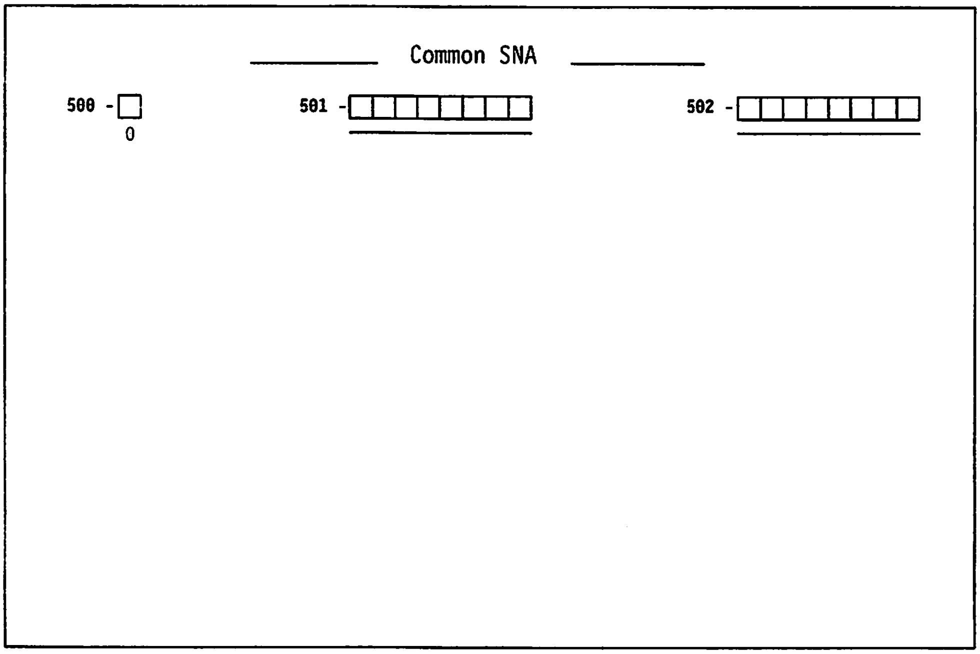
If you plan to configure for CSCM, you will need to ensure that your controller contains sufficient storage. The "Storage Planning Procedure" on page 3-3 will help you to determine your storage requirements. (Table 3-1 on page 3-4 contains the requirements for storage.)

The Common SNA Worksheet

If your response to question 101: Host Attachment was one of the following, you must fill out "Worksheet 24—Common SNA" (Figure 11-1).

- 2 – SDLC
- 3 – X.25
- 5 – Local SNA
- 6 – X.21
- 7 – Token-Ring Network.

On the worksheet, you respond to the questions that are discussed in this chapter.



Common SNA

500 -☐
0

501 -☐☐☐☐☐☐☐☐

502 -☐☐☐☐☐☐☐☐

Figure 11-1. An Example of Worksheet 24 – Common SNA

Filling In Worksheet 24—Common SNA

Planner: *The following questions appear on "Worksheet 24—Common SNA." This worksheet is filled out during step 3 of the procedure printed on the divider page labeled "Microcode Customization Planning."*

Locate "Worksheet 24—Common SNA" on page A-26. Write your responses to the following 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 the Token-Ring Gateway.

If you:

- Do not want to use CSCM, leave this question set to its default.
- Wish to use CSCM and the controller you are customizing for is a Network Site Controller, respond with a 1.
- Wish to use CSCM and the controller you are customizing for is the Central Site Controller (not supported on small-cluster controllers), respond with a 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 that is using the SNA Network Interconnection function. 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 for each network. Provide the same response to this question for each controller within a given 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

```
NETCONTA (valid)
NW CONTA (invalid)
```

The default is blanks.

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.

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.

Planner: *You have completed "Worksheet 24—Common SNA."*

Return to the divider page labeled "Microcode Customization Planning," and see step 3 to determine if there are additional worksheets that you need to fill out to complete this 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 5-7.

Chapter 12. Planning for the Asynchronous Emulation Adapter

Getting Ready to Plan for the Asynchronous Emulation Adapter

The information in this chapter will help you complete step 5 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will need the following:

- The applicable worksheets in Appendix A:
  - "Worksheet 16—3270 Attachment Diagram"
  - "Worksheet 17—ASCII Attachment Diagram"
  - "Worksheet 18—AEA Configure"
  - "Worksheet 19—AEA Port Set"
  - "Worksheet 20—AEA Port to Port Set Map"
  - "Worksheet 21—AEA Station Set"
  - "Worksheet 22—AEA Default Destination."
- 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).

Note: To use the AEA, you need the AEA microcode that was supplied with the adapter and a second disk drive to download the microcode. You may need to plan for merging the AEA microcode onto a DSL disk; see the *3174 Utilities Guide*, GA27-3853, for the Merge DSL procedure.

An Overview of the Asynchronous Emulation Adapter

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.

ASCII Terminal Emulation allows an IBM 3270 display station to emulate an IBM 3101 Display Station or a Digital Equipment Corporation (DEC) VT100, 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.

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 you are currently connected to. 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 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 nonbusy (available) port. If one is found, it is selected as the port through which the connection is processed.

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[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 12-1) shows a 3270 Terminal Emulation configuration in which a remote ASCII terminal is connected over telephone lines to an IBM host. The components of the configuration are labeled, and the specific AEA terms that apply to these components are shown below, in **bold**.

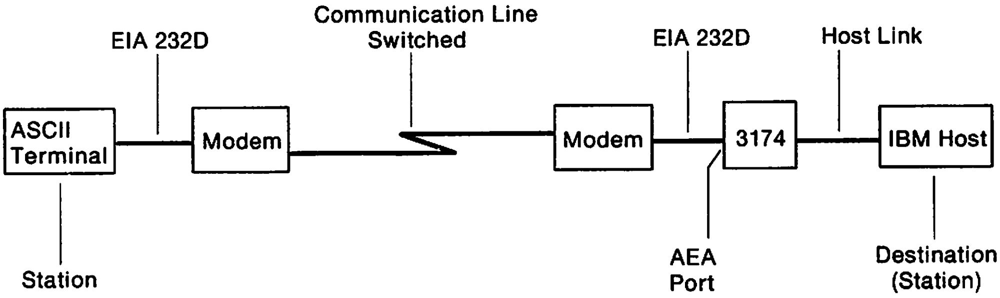

Figure 12-1. 3270 Terminal Emulation Example

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 12-1, 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 specifications. The AEA feature also supports auto-call[2] modems that conform to the EIA 232D specifications and to the IBM Attention Command Set (AT), the Hayes[3] AT command set, the Micom[4] auto-dial procedure, or the AEA manual calling[5] 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 12-1 on page 12-5, 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.

The user should 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 12-1 on page 12-5 is a *switched* port.

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[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] Trademark of Hayes Microcomputer Products, Inc.

[4] Trademark of Micom Systems, Inc.

[5] 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 at customization time; 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 12-2) shows an ASCII Terminal Emulation configuration in which a 3270 terminal is connected to 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.

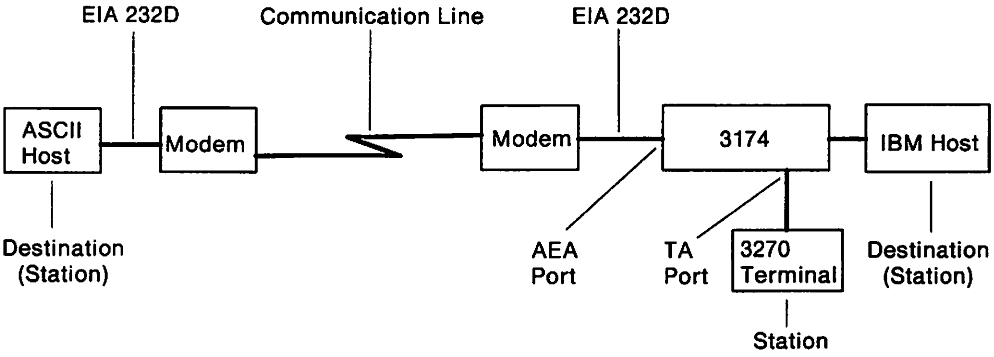

Figure 12-2. ASCII Terminal Emulation Example

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 will 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 will 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, and they must work together. You should provide such a controller specification that will consist of 3174 Attachment Diagrams that identify all the attached 3270 (synchronous) and 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 thirty-two 3270 devices connected to the Terminal Adapter (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 customization 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 EIA 232D 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 EIA 232D Cables: IBM does not provide EIA 232D 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 non-switched 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 EIA 232D leads.
- EIA connector gender changer. To run EIA 232D cable wrap tests with the wrap plug supplied with the AEA feature, you may need an EIA 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 12-12. Refer to that section for this information. The customization 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 panel(s), 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 EIA 232D cable checkout
2. Customization and modem checkout
3. Operational checkout.

Phase 1 – Customer Installation and EIA 232D 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 EIA 232D cables to the AEA ports.
3. Check the continuity of EIA 232D cables. For cables wired for connection to a modem, the wrap plug is attached to the end of an EIA 232D cable. ALT 1 IML wrap tests are run on the selected AEA port[6] (refer to the *3174 User's Guide* for test procedures). The procedure should be repeated for each cable. You

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[6] 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.

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 EIA 232D cables to modems, limited-distance modems, or "null modems."[7]
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 *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[8], 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. 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.

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[7] 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 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 (see *3174 Site Planning*, GA23-0213).

[8] Refer to the *3174 Terminal User's Reference for Expanded Functions* for Connection Menu procedures.

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.

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 will 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 will also need to know what additional default destinations must be specified).

Using this information, you will be guided through two worksheets: "Worksheet 16—3270 Attachment Diagram" and "Worksheet 17—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 12-33 when you are ready.

You will use the two completed attachment diagrams to complete the AEA worksheets, which you will give to the person actually performing the customizing procedures.

The two diagrams are an important aid in planning the AEA configuration. Starting on page 12-17, you will be guided through the procedures for filling out 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.

Note: Separate port sets must be defined for ASCII host 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 (speed, parity, stop bits); 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, the user 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. 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

You need to take into consideration Multiple Logical Terminals (MLT) and storage when planning for the AEA. The following section discusses what should be considered.

MLT

MLT is a 3174 function that allows 3270 CUT display stations to access multiple host sessions; these sessions may be to a single IBM host, or to an IBM host and one or more ASCII hosts. 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, 3270 display stations may 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 will 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.

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. Under certain functional configurations, AEA will be deconfigured during IML if the controller does not contain sufficient storage to support the AEA and any other functions you have configured.

The "Storage Planning Procedure" on page 3-3 will help you to determine the storage requirements for the AEA and any other functions you are planning to configure. (Table 3-1 on page 3-4 contains these storage requirements.)

ASCII Display Stations Supported by the AEA

The following list of ASCII display stations[9] are supported by the AEA:

- ADDS Viewpoint A2
- ADDS Viewpoint/78
- Hazeltine 1500
- Esprit Executive 10/78
- Hewlett-Packard 2621B
- IBM 3101
- IBM 3161
- IBM 3162
- IBM 3163
- IBM 3164
- 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 VT241
- Personal Computers running FTTERM (IBM File Transfer Terminal Emulator Program).

Planner: *The following procedures for filling out 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.*

---

[9] The list of display stations contains several trademarks. Viewpoint is a trademark of Applied Digital Data Systems, Inc. Hazeltine is a trademark of Hazeltine Corp. Esprit is a trademark of Esprit Systems, Inc. Hewlett-Packard is a trademark of the Hewlett-Packard Company. Lear Siegler is a trademark of Lear Siegler, Inc. ADM is a trademark of Lear Siegler, Inc. Dumb Terminal is a trademark of Lear Siegler, Inc. TeleVideo is a trademark of TeleVideo Systems, Inc.

Filling Out Worksheet 16—3270 Attachment Diagram

Locate and remove "Worksheet 16—3270 Attachment Diagram" on page A-18. The following steps will guide you through the worksheet. **Read all these steps before filling out 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. (You can find additional AEA planning examples in Appendix B.) 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 3101 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 12-3.

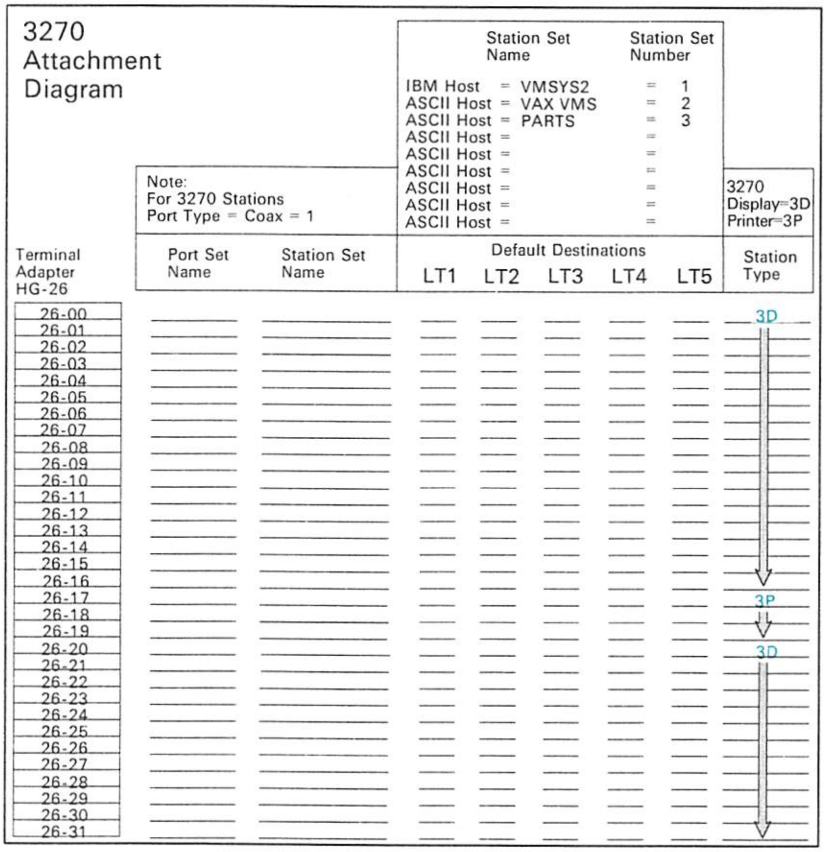
	Station Set Name	Station Set Number
IBM Host =	VMSYS2	= 1
ASCII Host =	VAX VMS	= 2
ASCII Host =	PARTS	= 3
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=
ASCII Host =		=

Figure 12-3. The 3270 Response Key

The name may be up to 24 characters long, and up to 28 ASCII hosts may be defined as station sets. The IBM host 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 12-3 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 control unit 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 12-4 gives an example of how to fill in this column on the 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
26-00								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								3P
26-18								
26-19								
26-20								3D
26-21								
26-22								
26-23								
26-24								
26-25								
26-26								
26-27								
26-28								
26-29								
26-30								
26-31								

Figure 12-4. Filling In the Station Type Column on the 3270 Attachment Diagram

In Figure 12-4, 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.

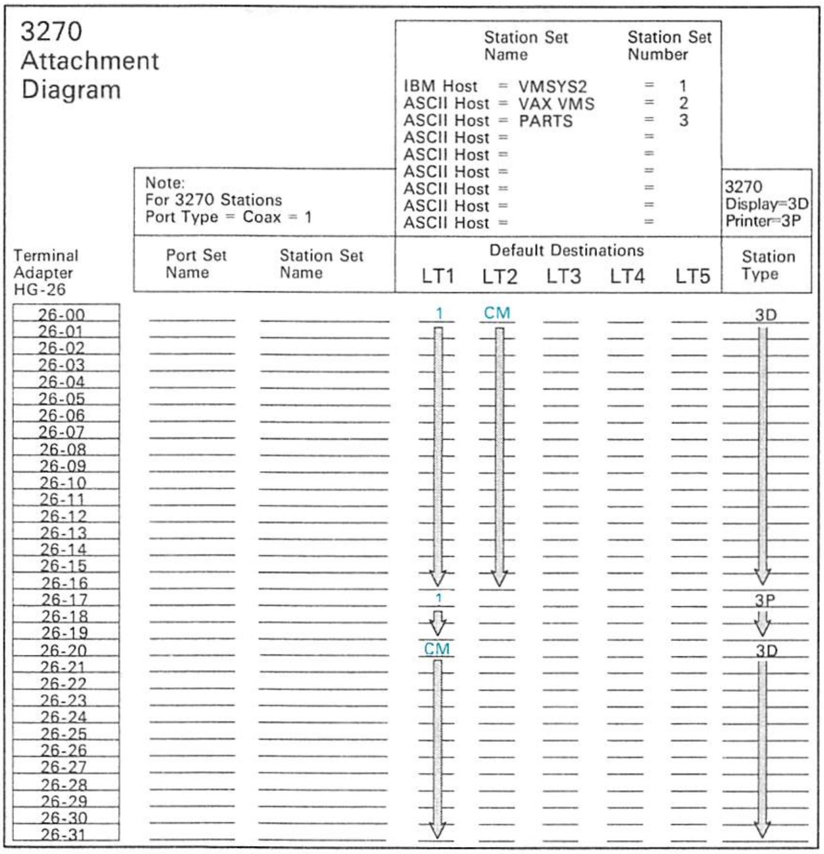
If you specify an ASCII host as a default destination, the host connection is established when the display station or printer is initially turned on; an AEA port supporting that host is dedicated to the display station or printer. In dedicating an AEA port supporting an ASCII host, access to that host 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.

Note: 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.

Figure 12-5 on page 12-20 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	=	=
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			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 12-5. Filling In the Default Destination Columns

In Figure 12-5, 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.*

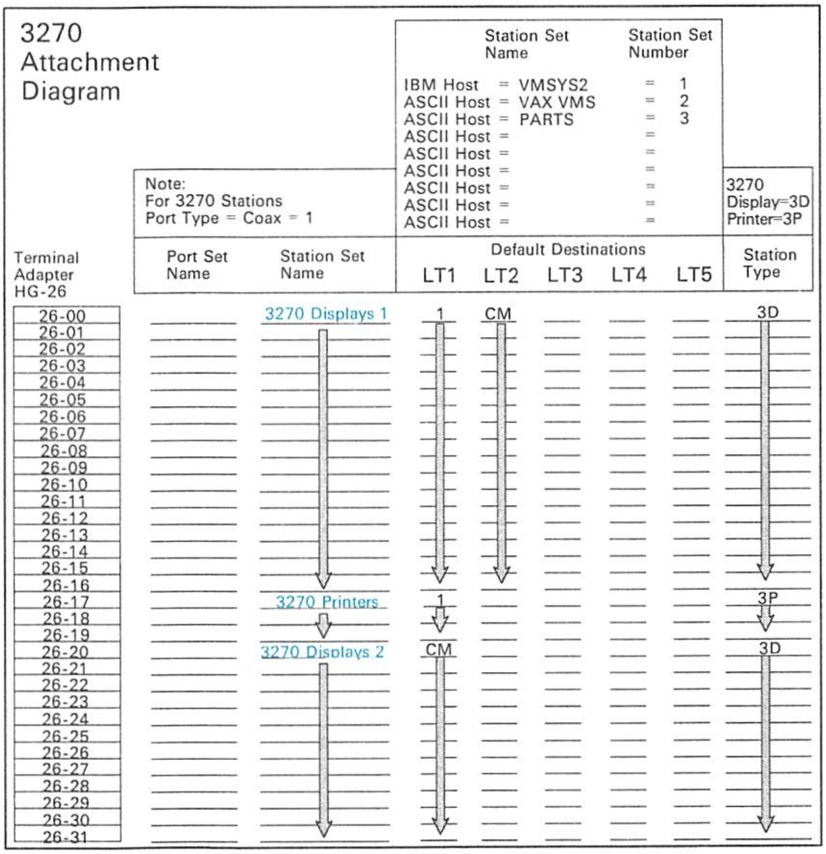
Printers

> 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 12-6 gives an example of how to group the 3270 stations into station sets.



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
26-00		3270 Displays 1	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		3270 Printers	1					3P
26-18								
26-19								
26-20		3270 Displays 2	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 12-6. An Example of 3270 Station Sets

In Figure 12-6, 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. 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 12-7 gives an example of how to sort the station sets and assign them to port sets.

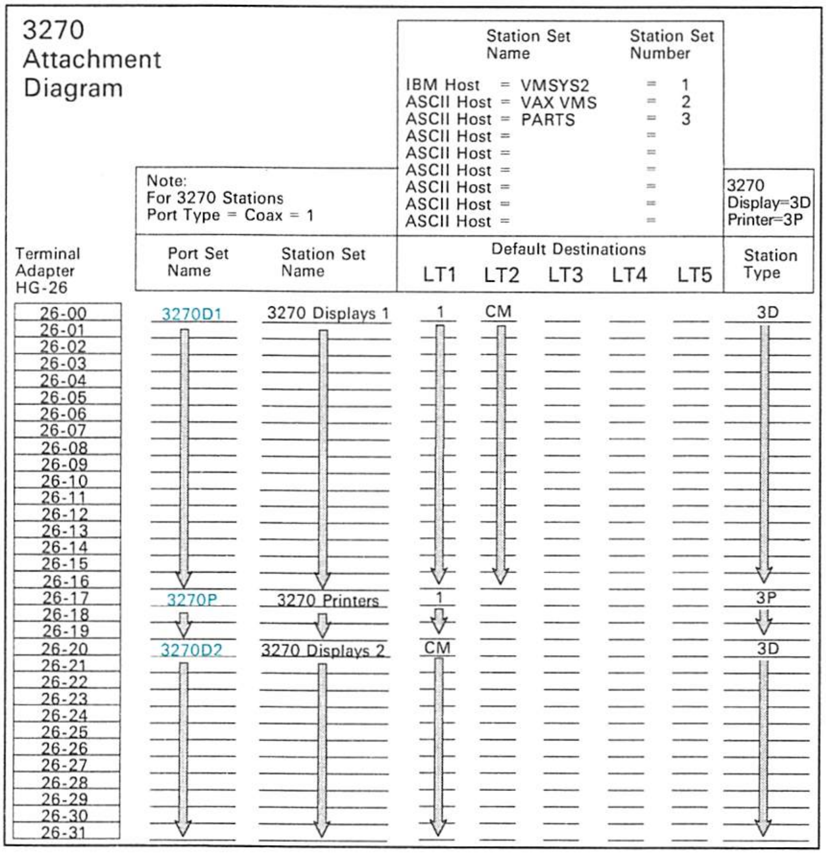


Figure 12-7. An Example of 3270 Port Sets

In Figure 12-7, 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.

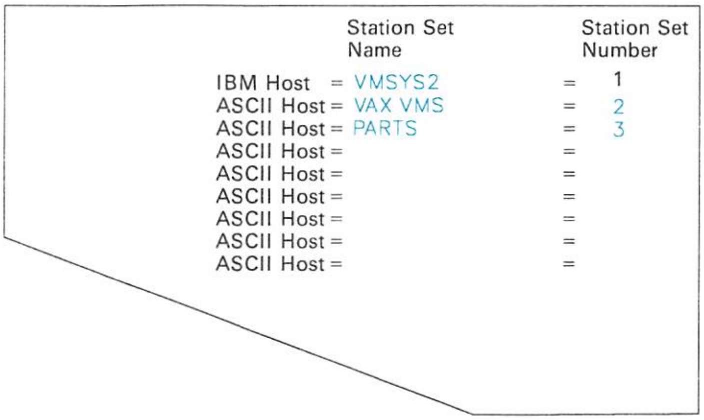
Planner: *You have completed the 3270 Attachment Diagram. Proceed to "Filling Out Worksheet 17—ASCII Attachment Diagram."*

Filling Out Worksheet 17—ASCII Attachment Diagram

Locate and remove "Worksheet 17—ASCII Attachment Diagram" on page A-19. The following steps will 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 Diagram into the response key for the ASCII Attachment Diagram (see Figure 12-8). *The name may be up to 24 characters long.* Figure 12-8 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 12-8. ASCII Response Key

In Figure 12-8, 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.

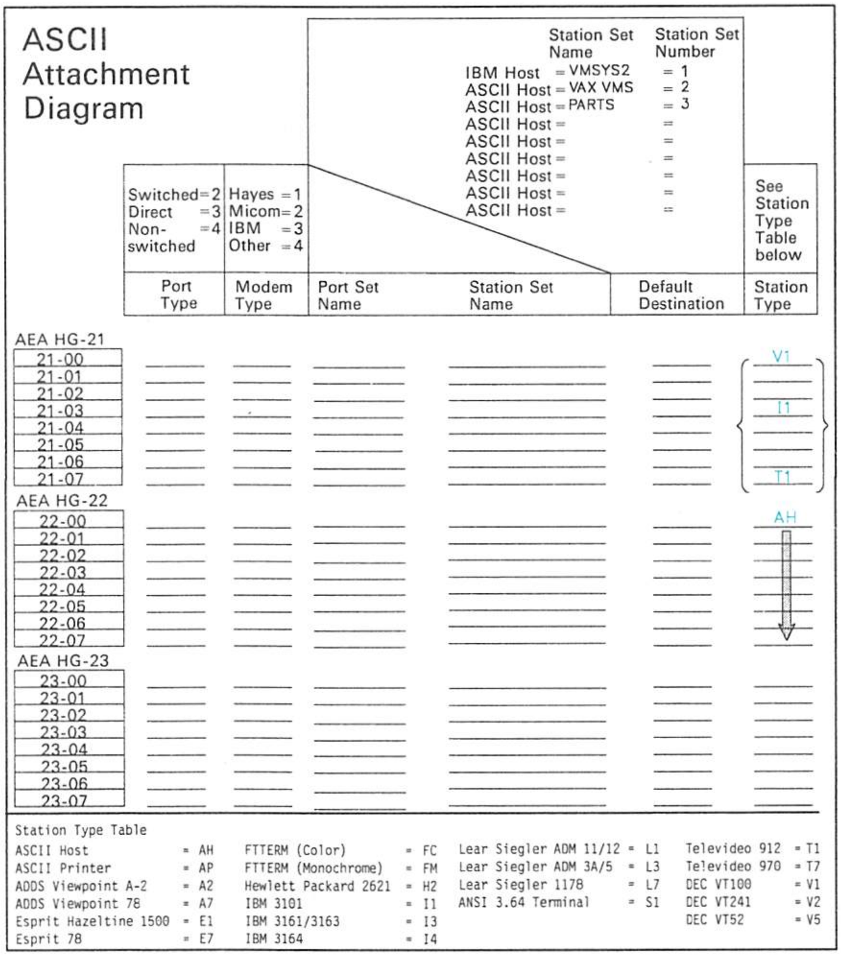
Using the Station type abbreviations listed at the bottom of the worksheet, fill in the Station Type column for each port of the AEA.

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 host(s) listed in the response key.

Figure 12-9 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, 21-01, 21-02, 21-03, 21-04, 21-05, 21-06, 21-07 — Station Type: V1, I1, T1

AEA HG-22: 22-00, 22-01, 22-02, 22-03, 22-04, 22-05, 22-06, 22-07 — Station Type: AH

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
ASCII Printer = AP
ADDS Viewpoint A-2 = A2
ADDS Viewpoint 78 = A7
Esprit Hazeltine 1500 = E1
Esprit 78 = E7
FTTERM (Color) = FC
FTTERM (Monochrome) = FM
Hewlett Packard 2621 = H2
IBM 3101 = I1
IBM 3161/3163 = I3
IBM 3164 = I4
Lear Siegler ADM 11/12 = L1
Lear Siegler ADM 3A/5 = L3
Lear Siegler 1178 = L7
ANSI 3.64 Terminal = S1
Televideo 912 = T1
Televideo 970 = T7
DEC VT100 = V1
DEC VT241 = V2
DEC VT52 = V5

Figure 12-9. Filling In the Station Type Column

In Figure 12-9, 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.

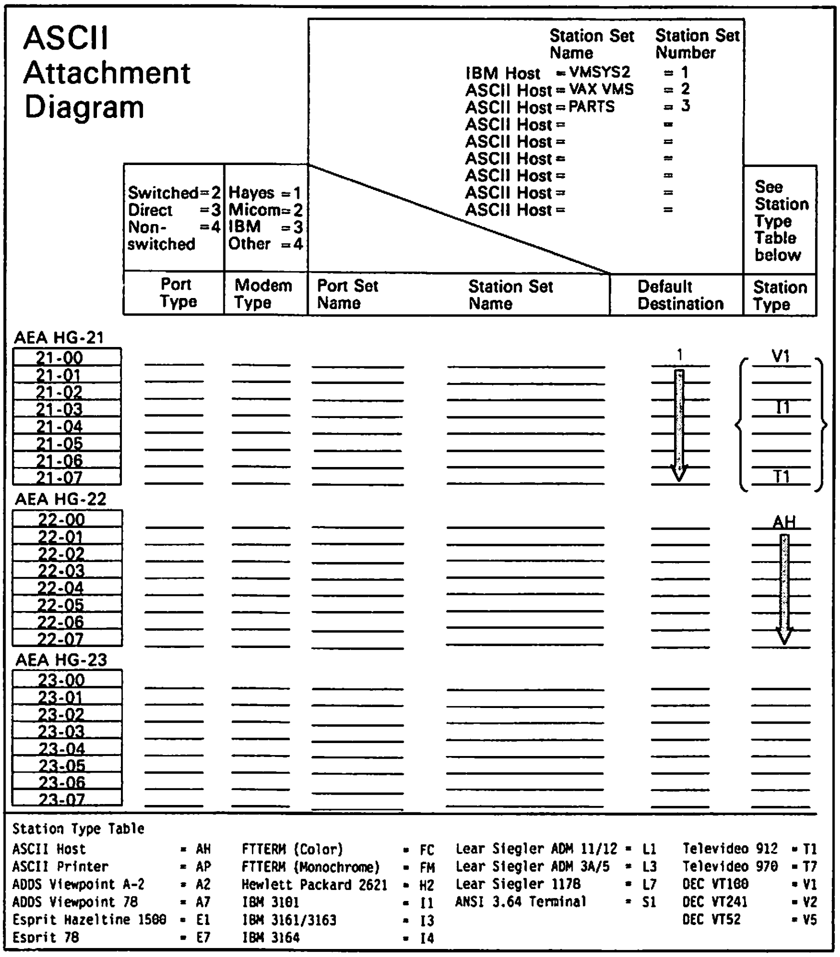
Step 3 Fill in the Default Destination column.

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.

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 12-10 on page 12-26 gives an example of how to fill in the Default Destination column on the ASCII Attachment Diagram.



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 =	=

Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
Switched=2 Direct =3 Non-switched =4	Hayes =1 Micom=2 IBM =3 Other =4				See Station Type Table below

AEA HG-21

21-00					1	V1
21-01						
21-02						
21-03						T1
21-04						
21-05						
21-06						
21-07						T1

AEA HG-22

22-00						AH
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 (Color)	= FC	Lear Siegler ADM 11/12	= L1	Televideo 912	= T1
ASCII Printer	= AP	FTTERM (Monochrome)	= FM	Lear Siegler ADM 3A/5	= L3	Televideo 970	= T7
ADDS Viewpoint A-2	= A2	Hewlett Packard 2621	= H2	Lear Siegler 1178	= L7	DEC VT100	= V1
ADDS Viewpoint 78	= A7	IBM 3101	= I1	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
Esprit Hazeltine 1500	= E1	IBM 3161/3163	= I3			DEC VT52	= V5
Esprit 78	= E7	IBM 3164	= I4				

Figure 12-10. Filling In the Default Destination Column on the ASCII Attachment Diagram

In Figure 12-10, 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 12-11 gives an example of how to fill in this column on the worksheets.

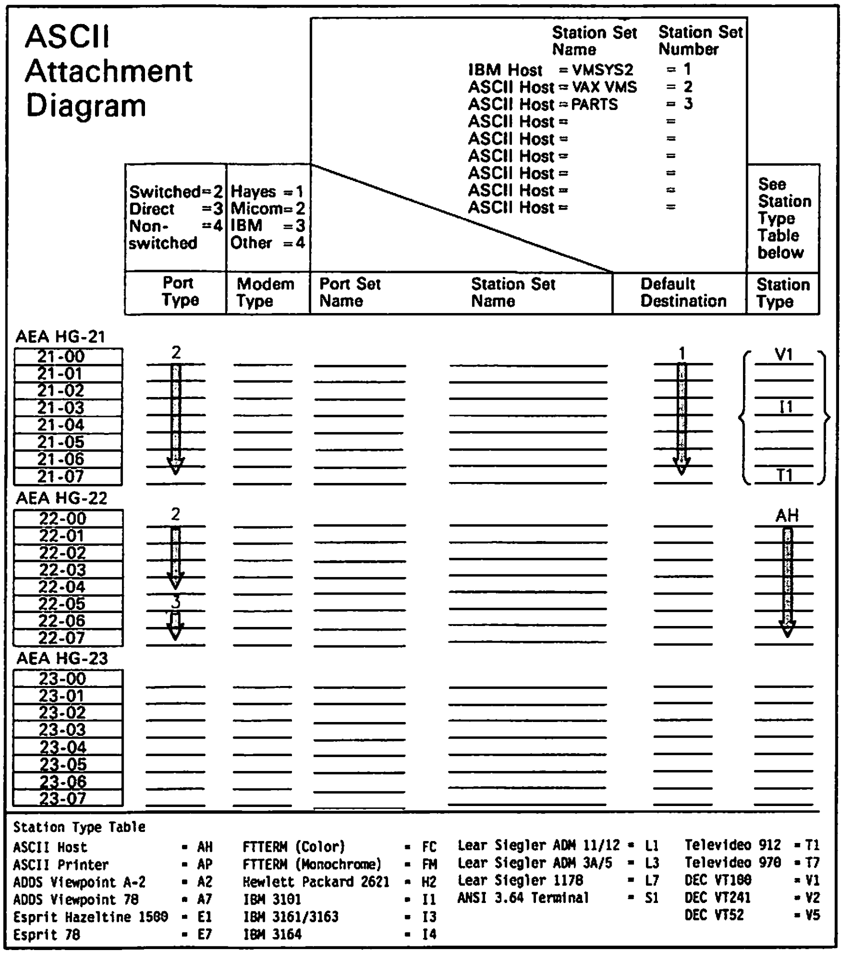


Figure 12-11. Filling In the Port Type Column

In Figure 12-11, 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.

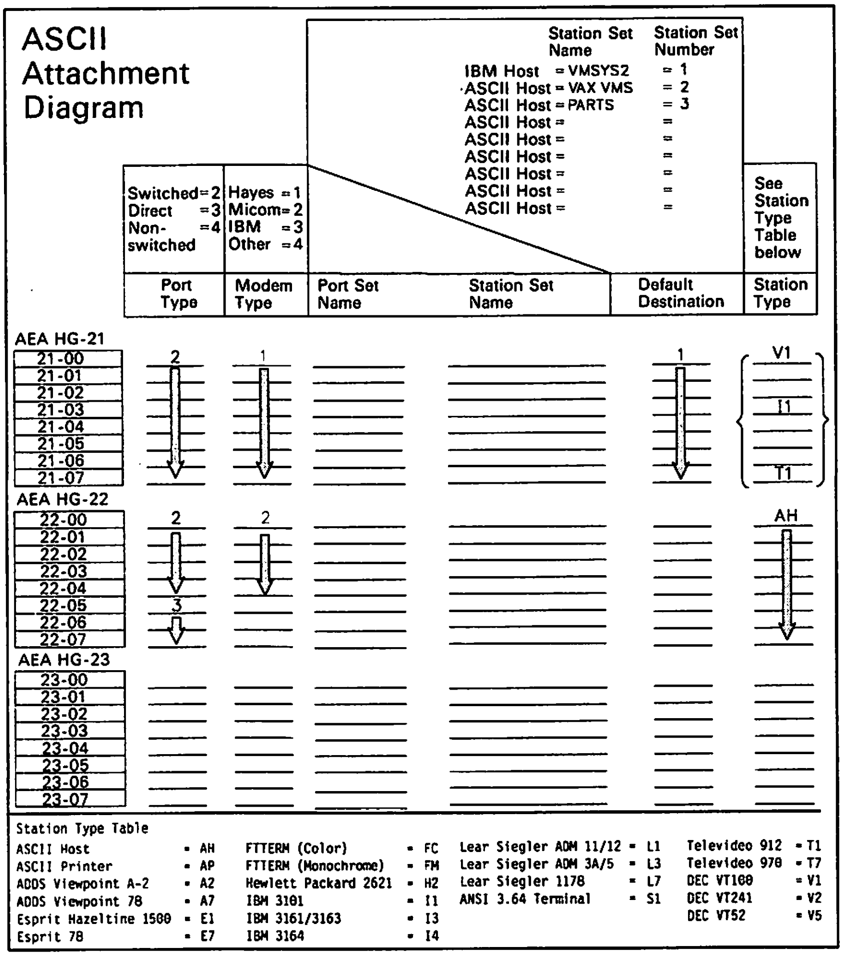
Step ***5*** Fill in the Modem Type.

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[10] (or Hayes-compatible)
2 = Micom[11] (or Micom-compatible)
3 = IBM
4 = Other (modems that meet the AEA specifications).

Figure 12-12 gives an example of how to fill in this column on the worksheets.



Station Type Table

ASCII Host = AH
ASCII Printer = AP
ADDS Viewpoint A-2 = A2
ADDS Viewpoint 78 = A7
Esprit Hazeltine 1500 = E1
Esprit 78 = E7
FTTERM (Color) = FC
FTTERM (Monochrome) = FM
Hewlett Packard 2621 = H2
IBM 3101 = I1
IBM 3161/3163 = I3
IBM 3164 = I4
Lear Siegler ADM 11/12 = L1
Lear Siegler ADM 3A/5 = L3
Lear Siegler 1178 = L7
ANSI 3.64 Terminal = S1
Televideo 912 = T1
Televideo 970 = T7
DEC VT100 = V1
DEC VT241 = V2
DEC VT52 = V5

Figure 12-12. Filling In the Modem Type Column

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[10] Trademark of Hayes Microcomputer Products, Inc.

[11] Trademark of Micom Systems, Inc.

In Figure 12-12, 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.

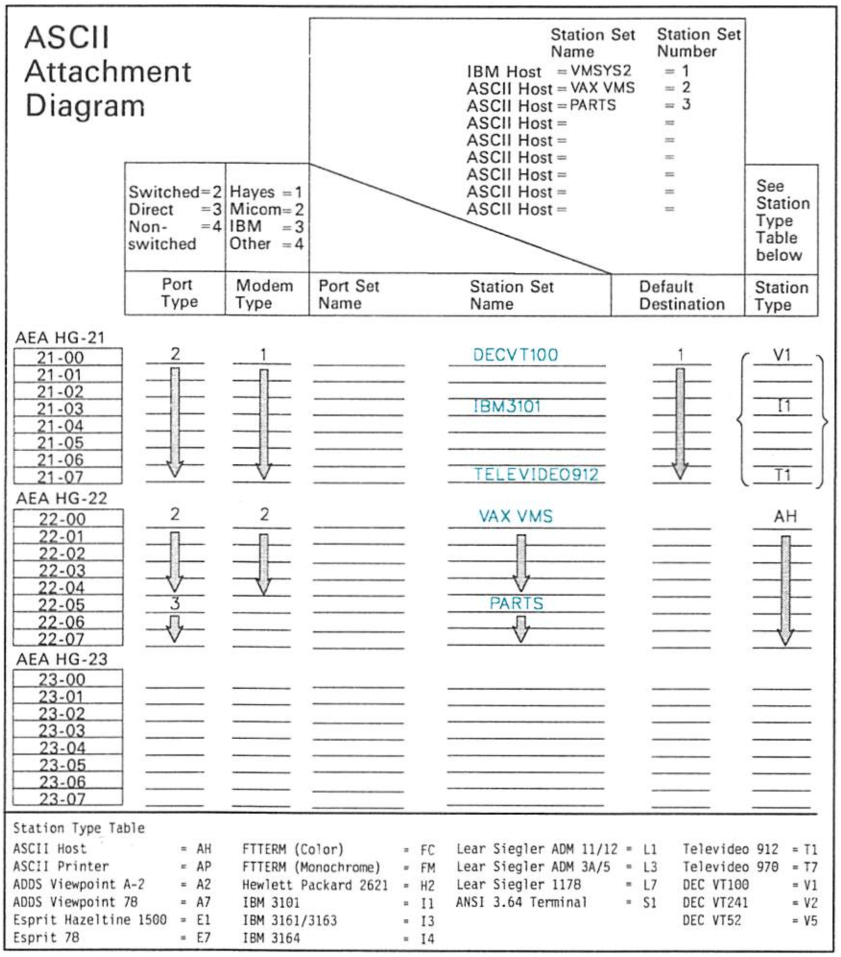
Printers

> 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 12-13 gives an example of how to sort the stations into station sets.



Station Type Table

ASCII Host = AH
ASCII Printer = AP
ADDS Viewpoint A-2 = A2
ADDS Viewpoint 78 = A7
Esprit Hazeltine 1500 = E1
Esprit 78 = E7
FTTERM (Color) = FC
FTTERM (Monochrome) = FM
Hewlett Packard 2621 = H2
IBM 3101 = I1
IBM 3161/3163 = I3
IBM 3164 = I4
Lear Siegler ADM 11/12 = L1
Lear Siegler ADM 3A/5 = L3
Lear Siegler 1178 = L7
ANSI 3.64 Terminal = S1
Televideo 912 = T1
Televideo 970 = T7
DEC VT100 = V1
DEC VT241 = V2
DEC VT52 = V5

Figure 12-13. Filling In the AEA Station Set Name Column

In Figure 12-13, 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 and modem types. Name each group and write the corresponding name in the Port Set Name column for each station set assigned to that port set. **If two or more station sets have the same station type, assign them to different port sets.**

Station sets made up of printers

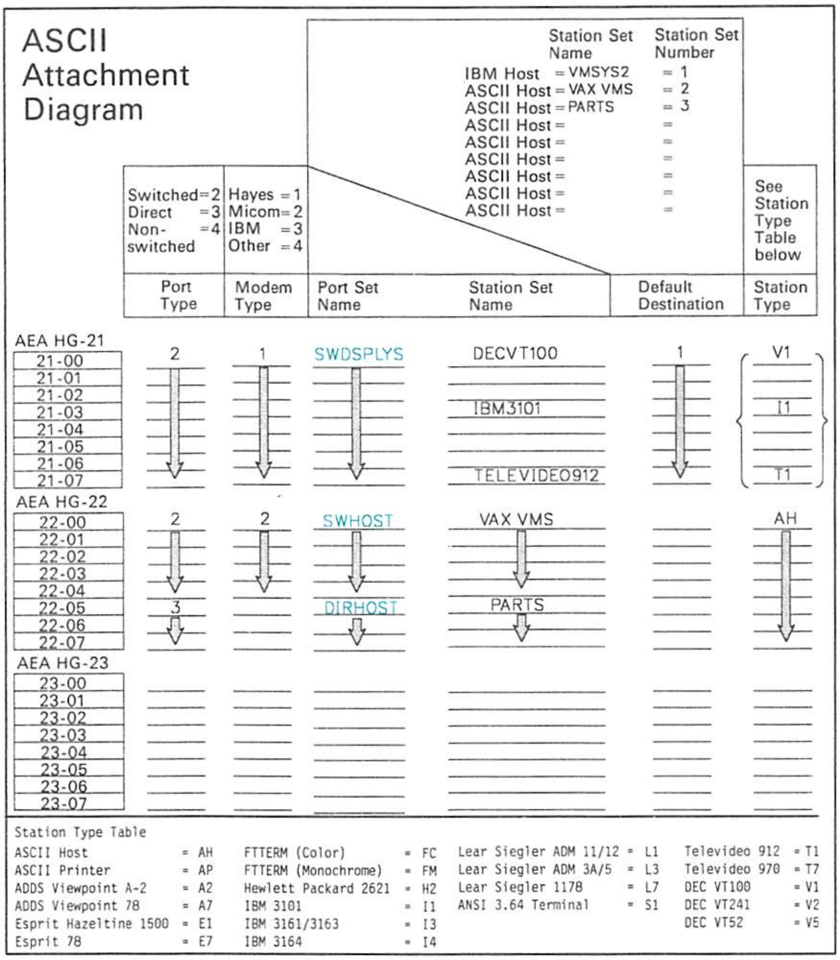
> Assign each printer station set to an individual port set and name the port set. Write the corresponding name in the Port Set Name column for each station set.

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: You can assign ASCII host station sets to a port set that contains a station set made up of display stations or printers if the port set and ASCII host station set have the same port and modem type.

A port set name can be up to 8 characters long. Figure 12-14 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
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	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 (Color)	= FC	Lear Siegler ADM 11/12	= L1	Televideo 912	= T1
ASCII Printer	= AP	FTTERM (Monochrome)	= FM	Lear Siegler ADM 3A/5	= L3	Televideo 970	= T7
ADDS Viewpoint A-2	= A2	Hewlett Packard 2621	= H2	Lear Siegler 1178	= L7	DEC VT100	= V1
ADDS Viewpoint 78	= A7	IBM 3101	= I1	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
Esprit Hazeltine 1500	= E1	IBM 3161/3163	= I3			DEC VT52	= V5
Esprit 78	= E7	IBM 3164	= I4				

Figure 12-14. An Example of AEA Port Sets

In Figure 12-14, 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 12-33.*

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 12-15 gives an example of how to number the station sets.

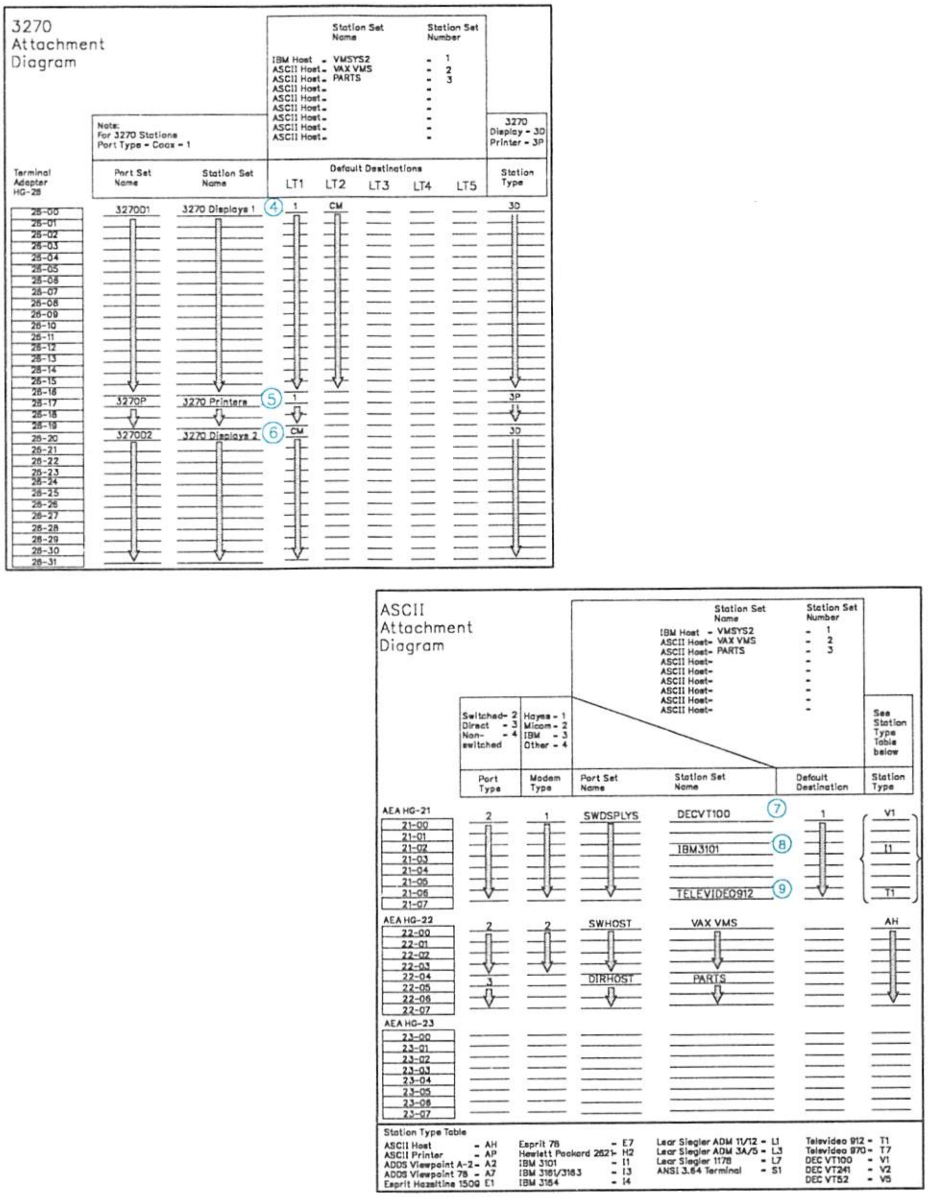


Figure 12-15. An Example of AEA Station Set Numbering

In Figure 12-15 on page 12-33, the IBM 3270 Host and two ASCII hosts have been numbered 1, 2, and 3. The 3270 Attachment Diagram has 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 two worksheets you just completed and the following information to fill out Worksheets 18 through 22. Worksheets 18 through 22 are needed by the person customizing the 3174 Establishment Controller to support the AEA.*

Remove Worksheets 18 through 22 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 Out Worksheet 18—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.

701: Password for ASCII Display Stations on Switched Lines

Response: Up to 8 alphanumeric characters (no blanks/spaces allowed).

This field specifies a password for all ASCII display stations operating on switched lines.

No response is necessary; if none is given, however, the display station user is not prompted for a password.

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	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	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.

Digit	Description
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

712: Miscellaneous ASCII Feature Options (C)

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	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 = No
1 = Yes.

The default response is 00000000.

Digits are numbered from left to right.

Digit	Description
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

Filling Out Worksheet 19—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 16—3270 Attachment Diagram" and "Worksheet 17—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 19—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 port sets can have one to five session limits. ASCII port sets can have only one session limit.

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.

Filling Out Worksheet 20—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 20—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 19—AEA Port Set.") Figure 12-16 gives an example of mapping (assigning) the controller ports to the port sets.

AEA Port Set

	Name	Session Limit	Port Type	Modem Type
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

TA (HG = 26)	0	1	2	3	4	5	6	7
(0-7)	1	1	1	1	1	1	1	1
(8-15)	1	1	1	1	1	1	1	1
(16-23)	1	2	2	2	3	3	3	3
(24-31)	3	3	3	3	3	3	3	3

	0	1	2	3	4	5	6	7
AEA 1 (HG = 21):	4	4	4	4	4	4	4	4
AEA 2 (HG = 22):	5	5	5	5	5	6	6	6
AEA 3 (HG = 23):								

Figure 12-16. Example of Port to Port Set Mapping (Assignment)

In Figure 12-16 on page 12-39, 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 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).

Filling Out Worksheet 21—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 will fill out the Station Set Worksheets in the order in which you numbered them.

Proceed to Table 12-1 on page 12-42. 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 Out Worksheet 22—AEA Default Destination" on page 12-56.

Table 12-1 on page 12-42 lists the questions that must be answered for each type of display station, host, and printer. If a √ 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 12-1. AEA Station-Type-Specific Questions

Question	ASCII Stations				3270 Stations			
	Host	Display Station	Printer	Display Station with Printer	Host	Display Station	Printer	Display Station with 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 Trigger	√	√	√	√				
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		√		√				
751: Data Stream Supported by the ASCII Host	√							
752: ASCII Host Phone Number	√							
761: Auto XON/XOFF (DEC VT100)	√							
762: Wraparound Option (DEC VT100)	√							
763: New Line Option (DEC VT100)	√							
764: Margin Bell Option (DEC VT100)	√							
771: Automatic Line Feed for Cursor Control (IBM 3101)	√							
772: Carriage Return/ Carriage Return—Line Feed Selection (IBM 3101)	√							
773: Automatic New Line for Cursor Control (IBM 3101)	√							
774: Scrolling (IBM 3101)	√							
775: Line Turnaround Character (IBM 3101)	√							
781: Shared Printer Prompt				√				
782: Use of Form Feed			√	√				
783: Page Length			√	√				
785: ASCII Printer Options			√	√				

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
Printer	AP	3P
Display Station:		3D
ADDS Viewpoint 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 3161, 3162, or 3163	I3	
IBM 3164	I4	
Lear Siegler ADM 11 or ADM 12	L1	
Lear Siegler ADM 3A or ADM 5	L3	
Lear Siegler ADM 1178	L7	
IBM 3162 Model 870	R0	
ROLM Cypress, Cedar, and Juniper	R1	
Honeywell VIP7801 Emulator* running on a Zentec Model 8001	R2	
ANSI 3.64 terminal	S1	
TeleVideo 912	T1	
TeleVideo 970	T7	
DEC VT100	V1	
DEC VT241	V2	
DEC VT52	V5	

*The Honeywell VIP7801 Emulator, developed by the Contel Corporation, runs in text/block mode only.

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.

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 a host connection other than their defined Default Destination from the Host Connection Menu.
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 data base documentation (for example, subscription information for remote ASCII data bases).*

731: Flow Control Type

Response:

0 = None
1 = XON/XOFF
2 = DTR (applicable only for nonswitched port types)
3 = CTS (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.
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 = CTS	When the AEA recognizes lead changes in Clear To Send (CTS), it will start or stop sending data. To start or stop data transmission from an attached device, the AEA will change 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 CTS flow control to function properly.

Refer to the host, display station, or printer setup information for your response.

732: XON/XOFF Transmission Resumption Trigger

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 will preclude display station "hangups" caused by an accidental transmission of XOFF.

733: Line Speed

Response: 0 through 7.

0 = Autobaud/Autoparity
1 = 300 bps
2 = 600 bps
3 = 1200 bps
4 = 2400 bps
5 = 4800 bps
6 = 9600 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
3 = 1200 bps
4 = 2400 bps
5 = 4800 bps
6 = 9600 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
1 = Odd
2 = Even
3 = None
4 = Space
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*.)

4 (Space) should be specified for transmissions requiring 8 bits and no parity. If 3 (None) is specified, the AEA will only send 7 data bits with no parity.

Note: If the parity specified is incorrect, response to transmissions will be absent or garbled.

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.

Note: 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
2 = 600 bps
3 = 1200 bps
4 = 2400 bps
5 = 4800 bps
6 = 9600 bps
7 = 19 200 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 that will be 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 will be 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 will 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.

751: Data Stream Supported by the ASCII Host

Response:

1 = Host uses VT100 data stream.
2 = Host uses 3101 data stream.

There is no default for this question.

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 17—ASCII Attachment Diagram" or "Worksheet 19—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 12-2 for the modem control characters that must be substituted for IBM or Hayes modems; see Table 12-3 for the modem control characters that must be substituted for Micom modems.

Notes:

1. If you are accessing a public data base, 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 12-2. 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 12-3. 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.

The example on page 12-51 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

```
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.

761: Auto XON/XOFF (DEC VT100 Data Stream)

Planner: *Questions 761 through 764 apply to ASCII host stations that use a DEC VT100 data stream. They define the VT100 setup options the host expects the VT100 to use.*

Refer to DEC VT100 setup information and to supporting documentation for currently operating local VT100 display stations. The DEC VT100 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 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 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 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.

771: Automatic Line Feed for Cursor Control (IBM 3101 Data Stream)

Planner: *Questions 771 through 775 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.

781: Attached Printer Prompt

Response:

0 = No
1 = Yes.

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.

Notes:

1. Display stations with attached printers will not operate if you do not respond to question 781 with a 1.
2. If you have ASCII display stations with attached printers you must specify a nonzero response for question 110: Multiple Logical Terminals.

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 printer. 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.

785: ASCII Printer Options

Response: Eight digits (0 or 1).

0 = No
1 = Yes.

The default response is 11011000.

Digits are numbered from left to right.

Digit	Description
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved

Filling Out Worksheet 22—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 2 through 5 columns on the 3270 Attachment Diagram.

The station set numbers on "Worksheet 22—AEA Default Destination" correspond to the station set numbers on the 3270 and ASCII Attachment Diagrams.

- ASCII Attachment Diagram

  The default destination for each station set has already been specified on the ASCII Attachment Diagram.

  For each station set number found on the ASCII Attachment Diagram, write in the default destination for that station set number in the LT1 column of the AEA Default Destination Worksheet. *If a CM (for Connection Menu) is indicated, leave the LT1 column blank for that station set number.*

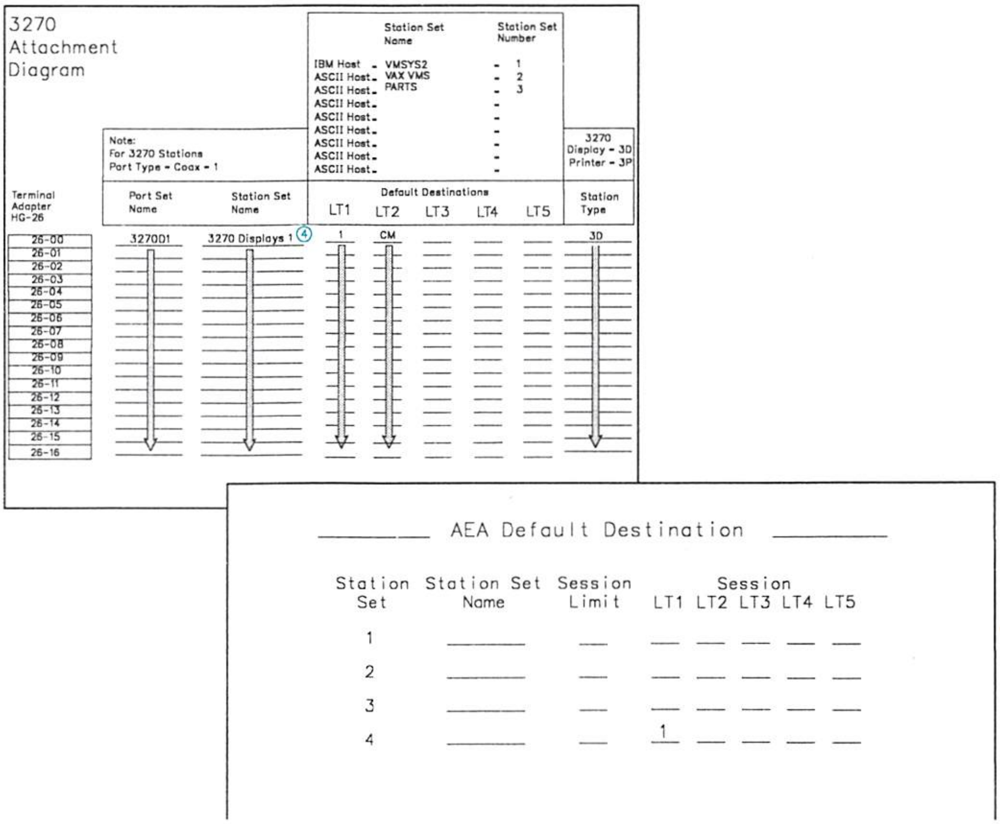
  Note: The session limit for ASCII terminals and printers is always 1. For an ASCII display with an attached printer, the session limit is also 1 (the default destination applies only to the display). Only the default destination for the display can be defined.

- 3270 Attachment Diagram

  The default destinations for each station set have already been specified in the Default Destination columns on the 3270 Attachment Diagram.

  For each station set number found on the 3270 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 a 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 12-17 on page 12-57 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

			Default Destinations					
Terminal Adapter HG-26	Port Set Name	Station Set Name	LT1	LT2	LT3	LT4	LT5	Station Type
26-00	327001	3270 Displays 1 ④	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								

AEA Default Destination

Station Set	Station Set Name	Session Limit	Session LT1	LT2	LT3	LT4	LT5
1							
2							
3							
4			1				

Figure 12-17. Example of the AEA Default Destination Worksheet

In Figure 12-17, the display stations in Station Set Number 4 have a 1 in the Default Destination 1 column and a CM in the Default Destination 2 column on the 3270 Attachment Diagram. 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 the CM.

Planner: *You have completed the worksheets required for AEA planning.*

Return to the divider page labeled "Microcode Customization Planning," and see step 5 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 5-7.

Chapter 13. Planning the Token-Ring Network 3270 Gateway

Getting Ready to Plan for the Token-Ring Network 3270 Gateway

This chapter describes additional questions you will answer to customize your 3174 controller for the Token-Ring Network 3270 Gateway feature. This chapter also presents an overall strategy to plan for the Token-Ring 3270 Gateway. The information in this chapter will help you to complete step 3 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Appendix C contains planning examples for local and remote gateways. Refer to these examples while planning for the microcode customization of your 3174 gateway controller.

Before you start, you will need the Token-Ring Gateway, Ring Address Assignment, and Ring Transmission Definition Worksheets (Worksheets 9, 10, and 11), in Appendix A.

Overall Planning of the Token-Ring 3270 Gateway Feature

The following information is intended as general planning steps for implementing the Token-Ring Network 3270 Gateway feature as supported by the 3174 Establishment Controller. Depending on the devices and host access method, you will 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:

- Host application requirements
- Personal Computer (PC) product requirements for attaching to the Token-Ring Network
- Physical Token-Ring configuration changes
- 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 stand-alone 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 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 3174 gateway models 1L and 11L:

- 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 models 1R, 2R, 11R, 12R, 51R, 52R, 61R, and 62R:

- Choose the SDLC address range that supports the 3174 gateway and attached devices.
- If 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 3174 gateway models 1L and 11L:

- 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 3174 gateway models 1R, 2R, 11R, 12R, 51R, 52R, 61R, and 62R:

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)
- If you a have half-duplex multidrop configuration, create VTAM/NCP definitions.

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 2KB inbound and 4KB outbound for 3174 models 1L and 11L.
- 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, 53R, and 63R. 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.
- Verify printers on PCs have the correct LU1 or LU3 Logmode entries.

For 3174 Gateway Models 1L and 11L:

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, 51R, 52R, 61R, and 62R:

Define a major node and NCP definition of a pseudo-multidrop line.

- Verify MAXDATA is 521 bytes for best performance.
- Verify you are using half-duplex lines.
- Verify the defined addresses are within the 3174 gateway address range.

Step 8 Install and customize the 3174 gateway.

Step 9 Customize the devices attaching to the Token-Ring Network.

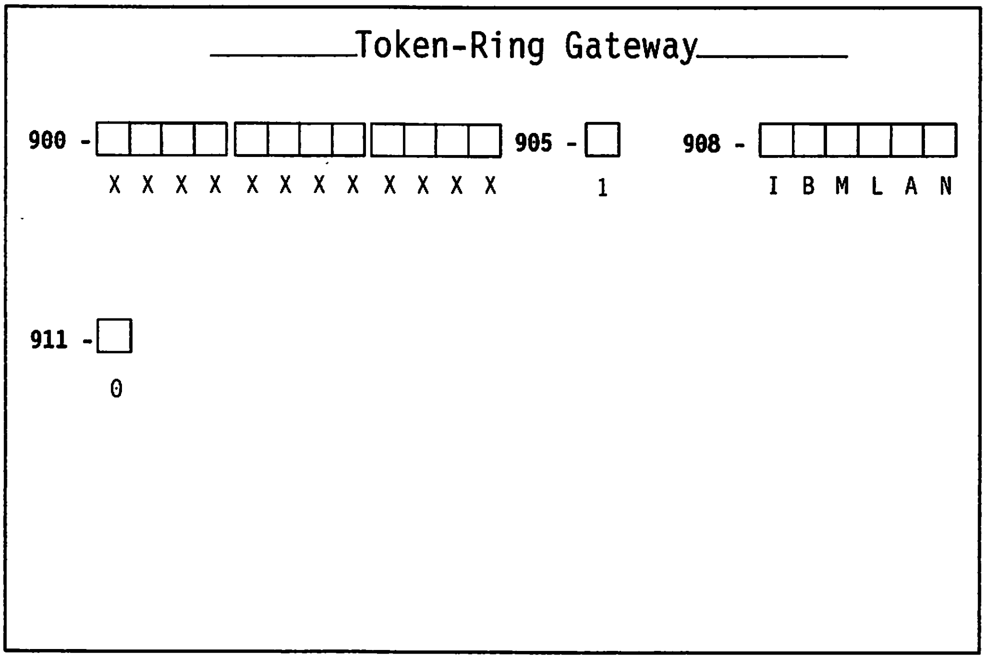
Step 10 Activate the 3174 gateway and Token-Ring-attached devices to the host.

The Token-Ring Gateway Worksheet

If your response to question 101 was either 2 or 5, and if one of the following is true, you must fill out "Worksheet 9—Token-Ring Gateway" (Figure 13-1).

- Your response to question 105 was not 00, **or**
- Your responses to questions 104 and 105 did not match.

On the worksheet, you respond to questions 900, 905, 908, and 911 using the information in this chapter.



Token-Ring Gateway

900 - X X X X X X X X X X X X

905 - 1

908 - I B M L A N

911 - 0

Figure 13-1. An Example of Worksheet 9 – Token-Ring Gateway

Filling In Worksheet 9 – Token-Ring Gateway

Locate "Worksheet 9—Token-Ring Gateway" on page A-11. Using the following information, write your responses to the questions on the worksheet.

900: Token-Ring Network Address for the Gateway

Response: Twelve-character hexadecimal address.

This address must be a locally administered address 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.

Note: The response for this question cannot be all zeros.

Ask your network planner for this address.

905: Ring Error Monitor (REM)

Response:

0 = No
1 = Yes.

The default response is 1.

For the ring that it 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 provides this information to the host communication and systems management (C&SM) when error thresholds have been exceeded.

908: Link Subsystem Name

Response: Six alphanumeric nonblank 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.

911: Ring Speed of the Gateway

Response:

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

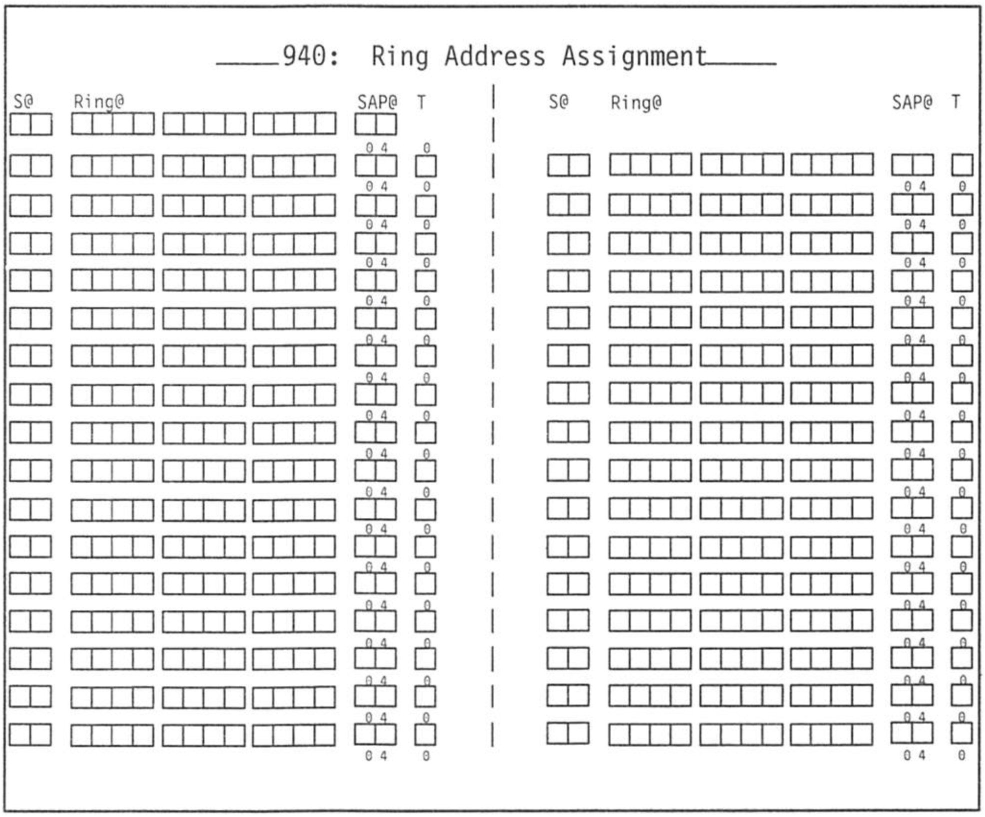
The default response is 0.

- For controllers with a 4Mbps Token-Ring adapters installed, 0 is the only valid response.
- For controllers with a 16/4Mbps Token-Ring adapters installed, 0, 1, or 2 is a valid response. A response of 2 is recommended for large networks.

Planner: *You have completed "Worksheet 9—Token-Ring Gateway." Continue with filling out "Worksheet 10—Ring Address Assignment."*

The Ring Address Assignment Worksheet

"Worksheet 10—Ring Address Assignment" (Figure 13-2) helps you set up the one-to-one correspondence between the subchannel addresses and the Token-Ring Network address of attaching products. Use the procedure on page 13-11 to fill out this worksheet.



940: Ring Address Assignment

S@	Ring@	SAP@	T	S@	Ring@	SAP@	T
		04	0				
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0

Figure 13-2. An Example of Worksheet 10 – Ring Address Assignment

940: Ring Address Assignment

The following information defines the columns on the Ring Address Assignment worksheet.

S@ Contains the addresses 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.

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 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.

The default is 0. 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 10 – Ring Address Assignment

Refer to the descriptions of the columns under "940: Ring Address Assignment" on page 13-9 if you need information to fill in a field on this worksheet.

Step *1* Locate "Worksheet 10—Ring Address Assignment" on page A-12. 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.

The default is 0.

Planner: *You have completed "Worksheet 10—Ring Address Assignment." Continue with "Worksheet 11—Ring Transmission Definition" on page A-13.*

The Ring Transmission Definition Worksheet

"Worksheet 11—Ring Transmission Definition" (Figure 13-3) helps you define the transmit I-frame size and maximum-out for each DSPU. Use the procedure on page 13-15 to fill out this worksheet.

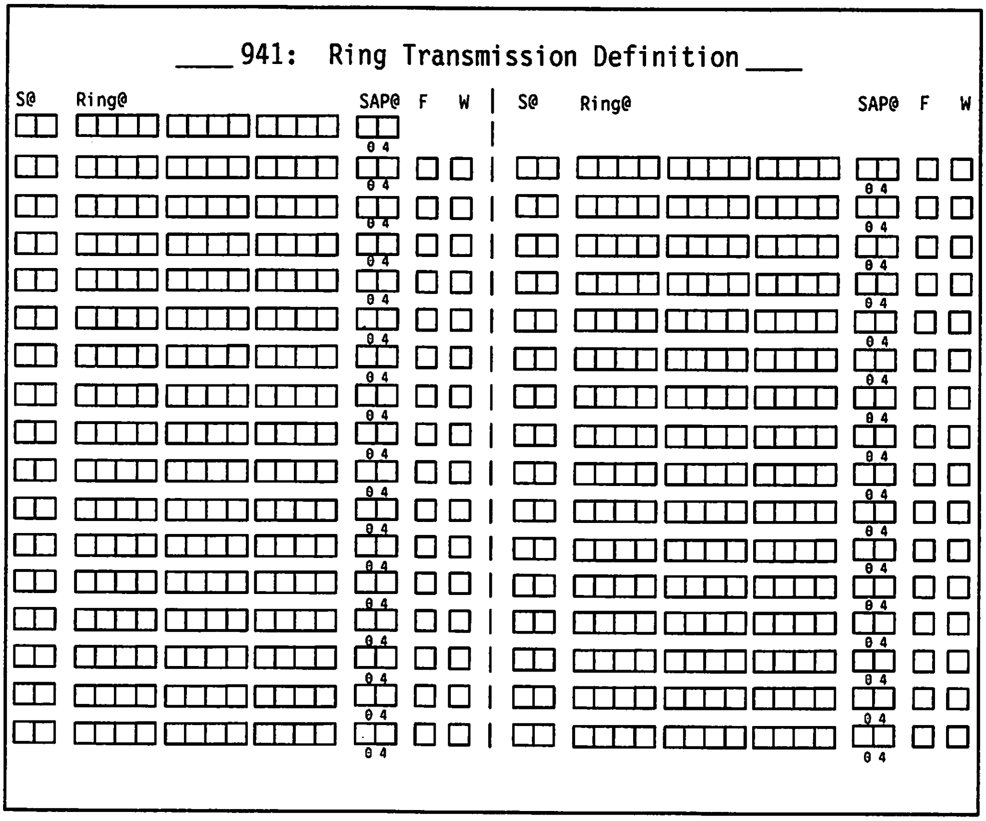


Figure 13-3. An Example of Worksheet 11 – Ring Transmission Definition

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 13-1.

Table 13-1. 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

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.

The value specified for the T (type) field on the Ring Address Assignment Worksheet determines the default. These defaults are listed in Table 13-1 on page 13-12.

Notes:

1. A response of 4 is valid only for controllers that have a 16/4Mbps Token-Ring Gateway adapter installed.
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 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 13-1 on page 13-12.

Consult your network planner for this information.

Note: If a 3174 Model 3R, 13R, 53R, or 63R is attached to the ring, the responses to questions 380 and 381 on these controllers' host-related worksheets ("Worksheet 8—Token-Ring Network" for each controller) should match the F and W fields described here.

Relationship between Questions 381 and 941

Token-Ring Network performance is enhanced by the values assigned to the Transmit Window Size (941) and the Receive Window Size (381).

It is strongly recommended that you set 381 to 1. This ensures that each received frame is acknowledged. (Very little congestion is added to Token-Ring Network traffic by the acknowledgment.)

The W-field (Transmit Window Size) of question 941 should be set greater than 381. A value of 2 or 3 is recommended for single-ring Token-Ring Networks. If bridges are included, a value of 4 should be considered. These values will permit uninterrupted transmission by eliminating wait for acknowledgments and will keep buffer resources in the gateway from being depleted.

Never set the W-field response of 941 to less than question 381's response. This causes a wait for acknowledgments and, thus, degraded performance.

Filling In Worksheet 11 – Ring Transmission Definition

Refer to the descriptions of the columns under "941: Ring Transmission Definition" on page 13-13 if you need information to fill in a field on this worksheet.

Step *1* Locate "Worksheet 11—Ring Transmission Definition" on page A-13. 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 Ring Address Assignment Worksheet.

Step *3* Duplicate the SAP@ responses from 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.

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 11—Ring Transmission Definition."*

Return to the divider page labeled "Microcode Customization Planning," and see step 3 to determine if there are additional worksheets you need to fill out to complete this 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 5-7.

Chapter 14. Planning to Define the Printer Authorization Matrix (PAM)

Getting Ready to Plan the Printer Authorization Matrix

The information in this chapter will help you to complete step 5 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will need the following:

- "Worksheet 15—Printer Authorization Matrix (PAM)" on page A-17
- Information about which printers are attached to which ports.

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 PAM. The information you need for planning the AEA is in Chapter 12.

What Is a Printer Authorization Matrix?

The Printer Authorization Matrix (PAM) defines which printers the display stations in a cluster can use for local copy, host copy, and shared copy operations. A local copy transfers data directly from the display buffer to the printer buffer, and the data is printed. Printers that will not be used for local copy should not be entered in the matrix.

When you define the PAM, the capabilities of the local copy printer 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 serviced. 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 15—Printer Authorization Matrix (PAM)" (Figure 14-1) helps you define which display stations will use which printers. Use the procedure on page 14-8 to fill in this worksheet.

```
            ______________________ PAM Definition ______________________
Entry         Printer           Mode           Class
              Port                        7             8
                                          01234 56789 012345

  _           -- _ --            __       ..... ..... ......
  _           -- _ --            __       ..... ..... ......
  _           -- _ --            __       ..... ..... ......
  _           -- _ --            __       ..... ..... ......
  _           -- _ --            __       ..... ..... ......


                  TA Display Port                        AEA Display Port

Entry  26                                    26 21        22        23
       0           1           2             3  0         0         0
       01234 56789 01234 56789 01234 56789 01 01234567 01234567 01234567
  _    ..... ..... ..... ..... ..... ..... .. ........ ........ ........
  _    ..... ..... ..... ..... ..... ..... .. ........ ........ ........
  _    ..... ..... ..... ..... ..... ..... .. ........ ........ ........
  _    ..... ..... ..... ..... ..... ..... .. ........ ........ ........
  _    ..... ..... ..... ..... ..... ..... .. ........ ........ ........
```

Figure 14-1. Example of a Worksheet 15 – Printer Authorization Matrix

The following describes the areas on this worksheet.

Entry In the Printer Entry, you identify the printer being assigned for local copy. Printer Entry numbers may range from 1 to 47. You can assign the printers according to the maximum number permitted on each model of the 3174 and the possible combinations of AEA and 3270 printers allowed on each model. The maximum number of all printers, ASCII and 3270, you can assign is 47. See Table 14-1 on page 14-5 for the maximum number of 3270 and AEA printer port assignments for the different models of the 3174.

Table 14-1. Permitted Printer Assignment Combinations

3174 Controller Models	Number of 3270 Printers	Number of AEA Printers
1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R	31	24[1]
51R, 52R, 61R, and 62R	15	8
53R, 63R, 81R, 82R, 91R, and 92R	7	0[2]

[1] Twenty-four ASCII printers are the maximum that can be assigned on the PAM; however, if 24 ASCII printers are assigned, only twenty-three 3270 printers can also be assigned; the total number of printer assignments permitted is 47.

[2] Models 53R, 63R, 81R, 82R, 91R, and 92R do not support the Asynchronous Emulation Adapter (AEA).

The Printer Entry field appears twice on the worksheet. In the top half of the worksheet, next to the Entry number, you define for each entry its Printer Port, Mode, and Class. In the bottom half of the worksheet, for the same Printer Entry, you identify the ports of the displays that will use the printer for local-copy operations.

Printer Port In this column, you identify the port number for the printer. Include the two-digit prefix: 26, 21, 22, or 23. You cannot assign a local copy printer to port 26-00.

If you have planned for individual port assignment, ensure that the assigned addresses on "Worksheet 12—117: Port Assignment" and the AEA Configure Worksheets (16 through 22) are consistent with the printer assignments defined here. The exception to this requirement is local-copy printers; they do not require a host address.

Mode This column is used to define the mode in which the printer will operate:

0 = System
1 = Local
2 = Shared.

System mode means the printer is under 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 system mode. When in system mode, the printer is protected from local copies, unless it is operating with BSC discipline. (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. Displays within the cluster may contend for the use of the printer, but the host may not. That is, the host cannot use the printer for direct-print operations. 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.

Shared mode means the printer performs both 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 will enter an **X** (capital letter) under the class or classes defined for the printer.

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 holding down the ALT key and pressing the IDENT key, and then keying in the authorized class number (70 through 85) next to the printer symbol on the bottom of the screen.

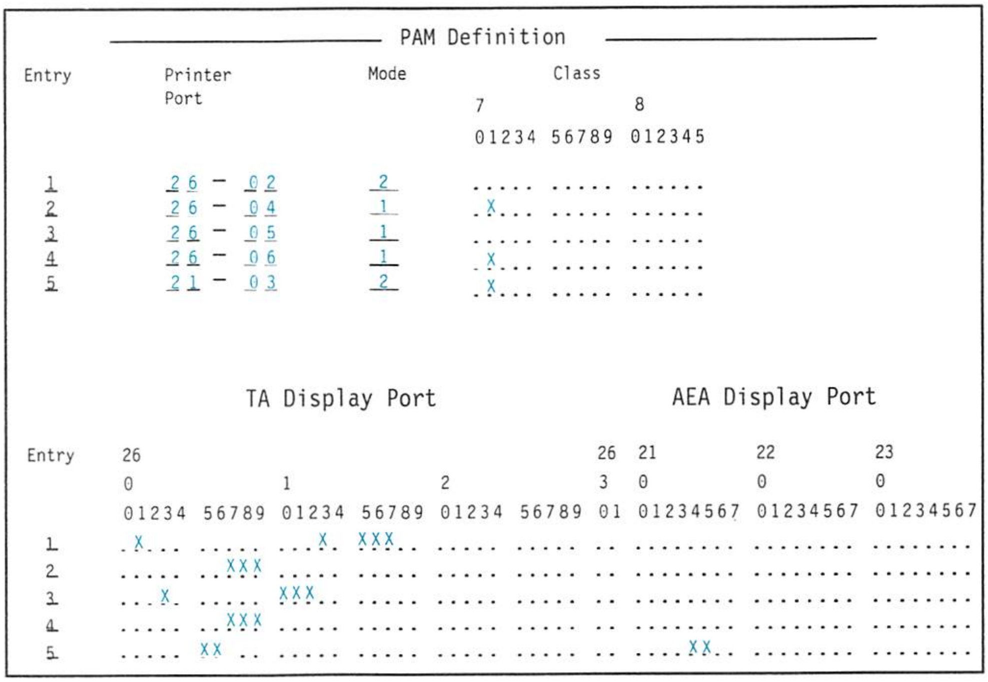
Display Port Your response in this field defines which displays may use each printer. You can assign more than one display to use the same printer for local copy.

Write an **X** under the port for each display authorized to use a particular printer for local copy.

Note: Displays cannot perform local copies on printers that have ASCII hosts designated as their default destination on "Worksheet 22—AEA Default Destination."

A Sample PAM

In the following figure, a sample Printer Authorization Matrix is defined.



```
           ____________________ PAM Definition ____________________
Entry        Printer             Mode              Class
             Port                            7              8
                                             01234 56789 012345

  1          26 - 02              2          ..... ..... ......
  2          26 - 04              1          .X... ..... ......
  3          26 - 05              1          ..... ..... ......
  4          26 - 06              1          .X... ..... ......
  5          21 - 03              2          .X... ..... ......


                    TA Display Port                       AEA Display Port

Entry   26                                         26 21         22        23
        0           1           2                  3  0          0         0
        01234 56789 01234 56789 01234 56789 01 01234567 01234567 01234567
  1     .X... ..... ...X. XXX.. ..... ..... .. ........ ........ ........
  2     ..... ..XXX ..... ..... ..... ..... .. ........ ........ ........
  3     ...X. ..... XXX.. ..... ..... ..... .. ........ ........ ........
  4     ..... ..XXX ..... ..... ..... ..... .. ........ ........ ........
  5     ..... XX... ..... ..... ..... ..... .. ....XX.. ........ ........
```

Figure 14-2. 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, and 26-17 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, 26-05, and 26-06 are authorized to use this printer.

Note: This printer must have a 3270 host designated as its default destination on "Worksheet 22—AEA Default Destination."

Filling Out Worksheet 15—Printer Authorization Matrix (PAM)

Planner: This worksheet is filled out during step 5 of the procedure on the page labeled "Microcode Customization Planning."

Step 1 Locate "Worksheet 15—Printer Authorization Matrix (PAM)" on page A-17. 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: Number each printer you plan to assign for local copy (for example, 1, 2, and 3).

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 15—Printer Authorization Matrix (PAM)" on page A-17.

Return to the divider page labeled "Microcode Customization Planning," and see step 5 to determine if there are additional worksheets 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 using one of the methods described under "Customization Records" on page 5-7.

Chapter 15. Planning to Modify Keyboards

Getting Ready to Plan the Modification of Keyboards

The information in this chapter will help you to complete step 5 of the procedure printed on the divider page labeled "Microcode Customization Planning."

Before you start, you will 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.

Overview of Modifying Keyboards

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.

Notes:

1. 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.
2. Do not modify keyboards attached through the Asynchronous Emulation Adapter. While active in ASCII host sessions, 3270 display station keyboards will not perform according to modified layouts.

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 15-4. 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 15-7.

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.

Warning: You should check with your system programmer to determine if any of your applications already has a function associated with the PA3 key. If the system programmer determines that pressing the (unlabeled) PA3 key will initiate a harmful action, you should instruct the customizer to use the Modify Keyboard procedure to remove the PA3 key from the keyboard.

Modify Keyboard Requirements

To use modified keyboards, it is necessary to answer question "137: Modified Keyboard Layouts" (see page 6-21) 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

- 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
  Enter
  Reset
  Device cancel
  Test
  System request
  Upshift or downshift.

  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
  Upshift (two keys)
  RESET/DEV CNCL
  ALT (two keys)
  ENTER (on main keyboard only)
  Downshift (Data Entry keyboard only).

- **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	

- **Do not** place any of the following functions anywhere on key 64 while modifying a Converged keyboard for 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 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.

- 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.

- Not all display stations with modifiable keyboards support the Data Entry keyboard layout.

- Shift keys (for example, Up-shift, Down-shift, and Alt-shift) 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.

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.

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.

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*, GA27-3853.)

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.

- When you are exchanging or copying a function between two keys, or deleting the function of a key.

  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" for illustrations of this condition.

- When the modification involves a single-shift (either the upper or lower 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.

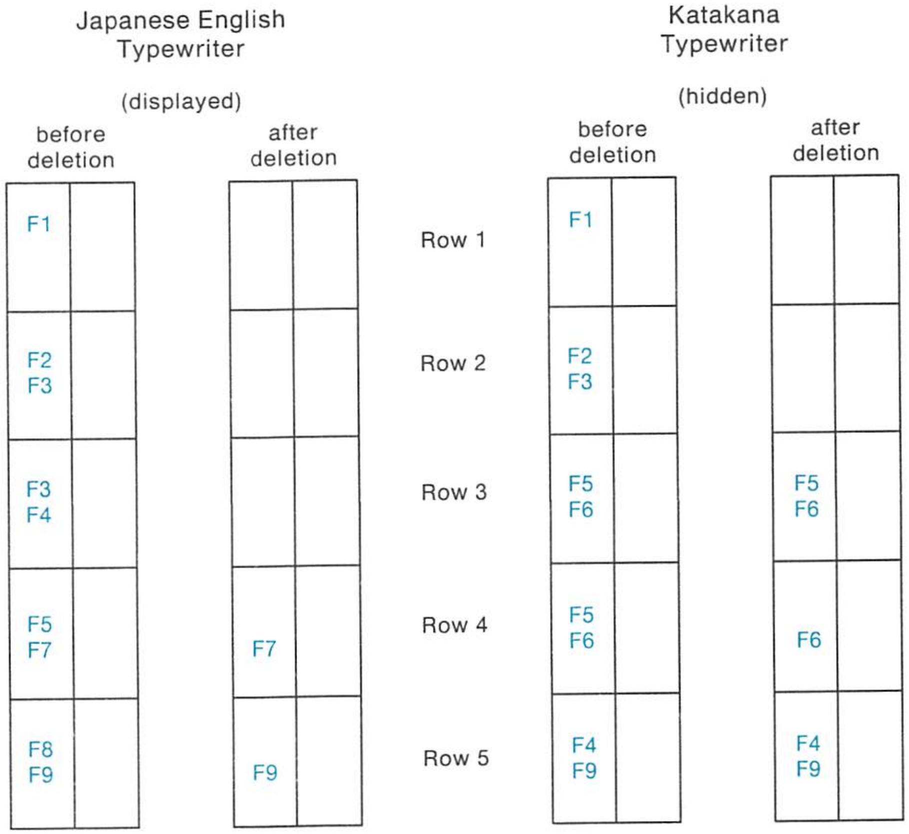
Examples of Two-Language Modification

The examples in Figures 15-1 and 15-2 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 15-1 represent the layout of function keys on the left-hand 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.



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 15-1. 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 15-2 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

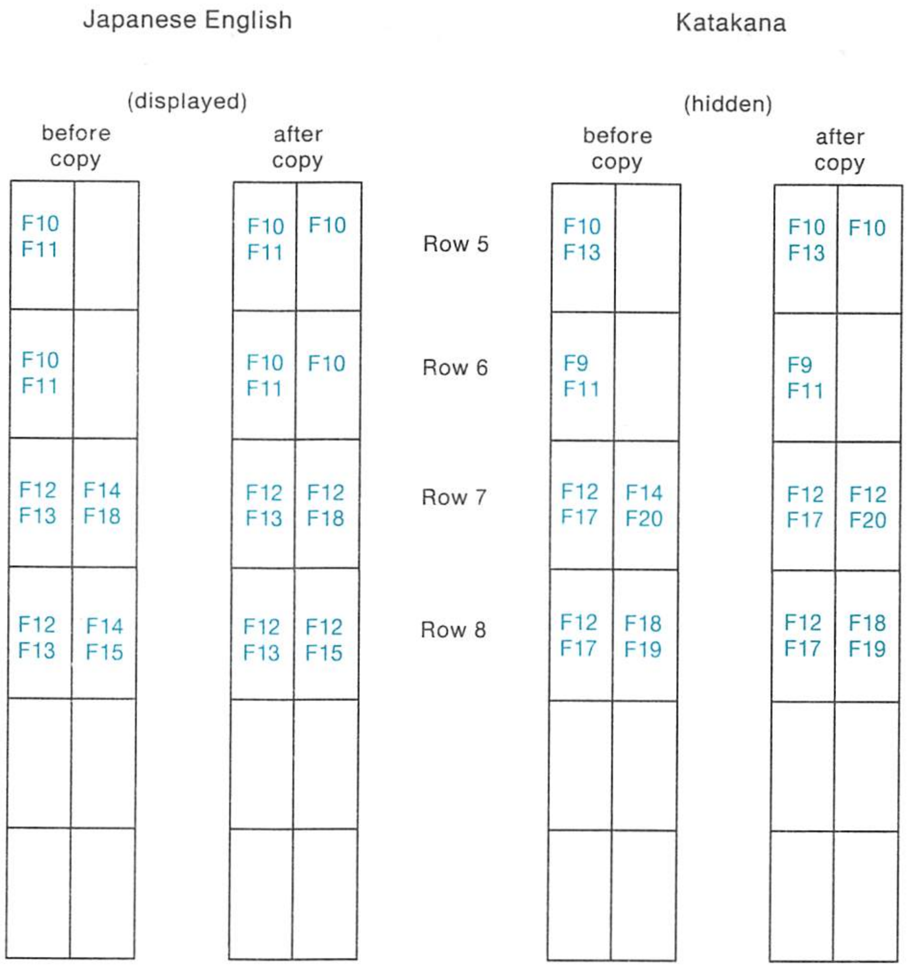
Row 1: Full-key copy; both the displayed and hidden keyboards are modified because they are functionally the same. The function in the alternate location is copied to the Katakana keyboard, but is not displayed.

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 15-2 (Part 1 of 2). Copying from One Key to Another Key



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 15-2 (Part 2 of 2). Copying from One Key to Another Key

Languages Supported on Modifiable Keyboards

Table 15-1. Languages Supported on Modifiable Keyboards

	Converged Keyboards			Enhanced Keyboard	
Keyboard Language	Type-writer	Data Entry	APL	Type-writer	Response
English (U.S.)	√	√	√	√	01
English (U.S.) ASCII-7	√				02[1]
Austrian/German	√	√	√	√	03
Belgian	√		√		04
Danish	√	√	√	√	07
Finnish	√	√	√	√	09
Italian	√	√	√	√	15
Japanese Katakana	√	√	√	√	17
Spanish	√		√	√	19
Spanish-Speaking	√	√	√	√	21
English (U.K.)	√	√	√	√	22
Norwegian	√	√	√	√	23
Swedish	√	√	√	√	24
Portuguese	√	√	√	√	28
Canadian Bilingual	√	√	√	√	29
French	√	√	√	√	30
English (U.S.) ASCII-International	√		√		33[2]
English (U.S.) 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

[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
    - U.K. English
    - U.S. 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 15-2 on page 15-14 lists the key functions and the corresponding displays.

Table 15-2. Key Function Nomenclature

	Key Function Display				
Key Function	**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 15-3. This chart appears on keyboard worksheets 1 through 5. Use the procedure on page 15-17 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 15-3. 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 15-4 on page 15-16.)
***From* Key Shift**	Designates which shift position(s) 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 position(s) 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 15-4. Keyboard, Shift, and Function Groups – Keyboard Changes Chart

A Sample Keyboard Changes Chart

Following is an example of planning a simple keyboard modification using the Keyboard Changes Chart. Read this example and use it as a reference when filling out 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 Keyboard Changes Chart below, the planner has indicated on the first row that he wishes:

- To make a change on 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 make a change on 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 15-5. 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 15-4. 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 (U.S.)
- 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 15-1 on page 15-12) 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 15-4 on page 15-16 and the description of the Keyboard Changes Chart columns on page 15-15, 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 15-4 on page 15-16 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 "d."

   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 15-4.

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 out 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*, GA27-3853.

Planner: You have completed planning for Modified Keyboards.

Return to the divider page labeled "Microcode Customization Planning," and see step 5 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 5-7.

Appendixes

Appendix A. Configuration Worksheets

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: ____________________
Serial: ____________________
Customized by: ____________________

Model: ____________________
Location: ____________________
Telephone: ____________________

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

__________ MODEL/ATTACH __________

099 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

100 - ☐☐☐
x x x

101 - ☐
x

099: Product Assistance Data
100: 3174 Model Designation
101: Host Attachment

Worksheet 2—BSC

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

BSC

104 - ☐☐ X X	108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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 0	175 - ☐☐☐☐☐☐ 0 0 0 0 0 0	176 - ☐ 0	178 - ☐ 0
317 - ☐ 0	318 - ☐ 0	340 - ☐ 0	

104: Controller Address
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
176: BSC Enhanced Communication Option: Distributed Function Terminals
178: 7232 Dual Controller Terminal Multiplexer Switching
317: Telecommunication Facilities
318: Full- or Half-Speed Transmission
340: RTS Control Options

Worksheet 3—X.25

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

X.25

104 - ☐☐ X X	108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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 0	175 - ☐☐☐☐☐☐ 0 0 0 0 0 0	178 - ☐ 0	
213 - ☐ 1	215 - ☐☐☐☐☐ 0 0 0 0 0	220 - ☐ 0	365 - ☐ 0

104: Controller Address
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert Function
365: X.21 Switched Host DTE Connection

Worksheet 4—SDLC

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

SDLC

104 - ☐☐
X X

105 - ☐☐
0 0

108 - ☐☐☐☐☐☐☐
0 0 0 0 0 0 0

110 - ☐
0

116 - ☐
0

121 - ☐☐
0 1

123 - ☐
0

125 - ☐☐☐☐☐☐☐☐
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

178 - ☐
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: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert 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 5—X.21 Switched

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

X.21 Switched

104 - ☐☐ X X	108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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	178 - ☐ 0	
213 - ☐ 1	215 - ☐☐☐☐☐ 0 0 0 0 0	220 - ☐ 0	
360 - ☐☐ 0	361 - ☐☐ 0 0	362 - ☐☐☐☐☐☐☐☐ 0 0 0 0 0 0 0 0	
367 - ☐ 0	368 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐		370 - ☐ 0

104: Controller Address
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert Function
360: X.21 Switched Retry
361: X.21 Switched Retry Timing
362: X.21 Switched Options
367: X.21 Switched Short-Hold Mode
368: X.21 Switched Short-Hold Mode Dial Number
370: Maximum Inbound I-Frame Size

Worksheet 6—Local (Non-SNA)

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

Local (Non-SNA)

104 - ☐☐ X X	105 - ☐☐ X X	108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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	178 - ☐ 0		
222 - ☐ 0	224 - ☐ 2	225 - ☐ 4		

104: Controller Address
105: Upper Limit Address
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
222: Support of Command Retry
224: Mode of Data Transfer
225: Channel Burst Size

Worksheet 7—Local (SNA)

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

Local (SNA)

104 - ☐☐ X X	105 - ☐☐ 0 0	108 - ☐☐☐☐☐☐☐ 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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	178 - ☐ 0		
213 - ☐ 1	215 - ☐☐☐☐☐ 0 0 0 0 0	220 - ☐ 0		
222 - ☐ 0	223 - ☐☐ 1 0	224 - ☐ 2	225 - ☐ 4	

104: Controller Address
105: Upper Limit Address
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration Level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert Function
222: Support of Command Retry
223: Attention Delay Value
224: Mode of Data Transfer
225: Channel Burst Size

Worksheet 8—Token-Ring Network

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

Token-Ring Network

106 - ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
X X X X X X X X X X X X

107 - ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
X X X X X X X X X X X X

108 - ☐☐☐☐☐☐☐
0 0 0 0 0 0 0

110 - ☐
0

116 - ☐
0

121 - ☐☐
0 1

123 - ☐
0

125 - ☐☐☐☐☐☐☐☐
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

178 - ☐
0

213 - ☐
1

215 - ☐☐☐☐☐
0 0 0 0 0

220 - ☐
0

380 - ☐☐☐☐
2 0 4 2

381 - ☐
1

382 - ☐☐☐☐
0 5 2 1

383 - ☐
2

384 - ☐
0

106: Token-Ring Network Address of the 3174
107: Token-Ring Network Address of the Gateway
108: Unique Machine Identifier
110: Multiple Logical Terminals (MLT) Configuration level
116: Individual Port Assignment
121: Keyboard Language
123: Country Extended Code Page Support
125: Miscellaneous Feature Options
127: Response Time Monitor (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: Distributed Function Terminal (DFT) Options
175: Distributed Function Terminal (DFT) Password
178: 7232 Dual Controller Terminal Multiplexer Switching
213: Between Bracket Printer Sharing
215: Physical Unit Identification
220: Alert Function
380: Maximum Receive I-Frame Size
381: Token-Ring Network Maximum In
382: Maximum Transmission I-Frame Size
383: Token-Ring Network Maximum Out
384: Ring Speed of the Token-Ring Network

Worksheet 9—Token-Ring Gateway

Chapter 13 of the *3174 Planning Guide* contains the planning information needed.

Token-Ring Gateway

900 - ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
X X X X X X X X X X X X

905 - ☐
1

908 - ☐☐☐☐☐☐
I B M L A N

911 - ☐
0

900: Token-Ring Network Address for the Gateway
905: Ring Error Monitor (REM)
908: Link Subsystem Name
911: Ring Speed of the Token-Ring 3270 Gateway

Worksheet 10—Ring Address Assignment

Chapter 13 of the *3174 Planning Guide* contains the planning information needed.

____940: Ring Address Assignment____

S@	Ring@	SAP@	T	S@	Ring@	SAP@	T
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	0				
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐ 0

Worksheet 11—Ring Transmission Definition

Chapter 13 of the *3174 Planning Guide* contains the planning information needed.

941: Ring Transmission Definition

S@	Ring@	SAP@	F	W	S@	Ring@	SAP@	F	W
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4							
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐
☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐	☐☐	☐☐☐☐ ☐☐☐☐ ☐☐☐☐	☐☐ 0 4	☐	☐

Worksheet 12—117: Port Assignment

Chapter 7 of the *3174 Planning Guide* contains the planning information needed.

117: Port Assignment

C@	#IS	LT1 P	LT2 S1	LT3 S2	LT4 S3	LT5 S4	C@	#IS	LT1 P	LT2 S1	LT3 S2	LT4 S3	LT5 S4
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						
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 13—128: RTM

Planner: Chapter 9 of the 3174 Planning Guide *contains the planning information needed.*

Circle the name that indicates the response you want to specify. If you circle Version A or Version B, write your responses in the corresponding area of the worksheet.

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

F1-00000000

B1	☐ 00	☐ 01	☐ 0
B2	☐ 00	☐ 02	☐ 0
B3	☐ 00	☐ 05	☐ 0
B4	☐ 00	☐ 10	☐ 0

Worksheet 14—X.25 Options

Chapter 10 of the *3174 Planning Guide* contains the planning information needed.

332: X.25 Options

400 - ☐☐ 0 0

401 - ☐ 4

402 - ☐☐☐☐ X X X X

403 - ☐ 1

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 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

424 - ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

430 - ☐ 1

431 - ☐ 0

432 - ☐☐ 0 2

433 - ☐ 2

434 - ☐ 1

435 - ☐☐ 0 2

440 - ☐ 9

441 - ☐☐

442 - ☐☐☐☐

450 - ☐☐☐☐ X X X X

451 - ☐☐ X X

452 - ☐☐☐☐☐☐☐☐

400: Network Type
401: Circuit Type
402: Logical Channel Identifier
403: Logical Link Control
409: X.25 Keyboard Support Options
420: Incoming Call Options
421: Outgoing Call Options
423: Host DTE Address (HNAD)
424: 3174 DTE Address
430: Negotiated Packet Size (NPKT)
431: Packet Sequence Numbering
432: Negotiated Window Size (NWND)
433: K-Maximum Out
434: Nonstandard Default Packet Size (DPKT)
435: Nonstandard Default Window Size (DWND)
440: Throughput Class Negotiation (TCLS)
441: Closed User Group (CUG)
442: Recognized Private Operating Agency (RPOA)
450: Link Level Transmit Timeout
451: Number of Retries
452: Connection Identifier Password (CID)

Worksheet 15—Printer Authorization Matrix (PAM)

Chapter 14 of the *3174 Planning Guide* contains the planning information needed.

PAM Definition

Entry	Printer Port	Mode	Class		
			7		8
			01234	56789	012345
_	__ _ __	___	.....	.....	......
_	__ _ __	___	.....	.....	......
_	__ _ __	___	.....	.....	......
_	__ _ __	___	.....	.....	......
_	__ _ __	___	.....	.....	......

Entry	TA Display Port							AEA Display Port		
	26						26	21	22	23
	0		1		2		3	0	0	0
	01234	56789	01234	56789	01234	56789	01	01234567	01234567	01234567
_	.....	.....	.....	.....	.....	.....	..	....	....	....
_	.....	.....	.....	.....	.....	.....	..	....	....	....
_	.....	.....	.....	.....	.....	.....	..	....	....	....
_	.....	.....	.....	.....	.....	.....	..	....	....	....
_	.....	.....	.....	.....	.....	.....	..	....	....	....

Worksheet 16—3270 Attachment Diagram

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

	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 LT1	LT2	LT3	LT4	LT5	Station Type
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 17—ASCII Attachment Diagram

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

	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 =		=

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
	Switched = 2 Direct = 3 Non-switched = 4	Hayes* = 1 Micom* = 2 IBM = 3 Other = 4				See Station Type Table below
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
ASCII Printer = AP
ADDS Viewpoint A-2 = A2
ADDS Viewpoint 78 = A7
Esprit Hazeltine 1500 = E1
Esprit 78 = E7

FTTERM (Color) = FC
FTTERM (Monochrome) = FM
Hewlett Packard 2621 = H2
IBM 3101 = I1
IBM 3161/3163 = I3
IBM 3164 = I4

Lear Siegler ADM 11/12 = L1
Lear Siegler ADM 3A/5 = L3
Lear Siegler 1178 = L7
ANSI 3.64 Terminal = S1

Televideo 912 = T1
Televideo 970 = T7
DEC VT100 = V1
DEC VT241 = V2
DEC VT52 = V5

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*Trademark acknowledgments can be found in Chapter 12 of the *3174 Planning Guide*, GA27-3844

Worksheet 18—AEA Configure

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

AEA Configure

700 - ☐
0

701 - ☐☐☐☐☐☐☐☐

710 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

711 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

712 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

713 - ☐☐☐☐☐☐☐☐
0 0 0 0 0 0 0 0

700: Configure the AEA Feature
701: Password for ASCII Displays on Switched Lines
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 19—AEA Port Set

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

__________ AEA Port Set __________

	Name	Session Limit	Port Type	Modem Type
1	________	____	____	____
2	________	____	____	____
3	________	____	____	____
4	________	____	____	____
5	________	____	____	____
6	________	____	____	____
7	________	____	____	____
8	________	____	____	____
9	________	____	____	____
10	________	____	____	____
11	________	____	____	____
12	________	____	____	____
13	________	____	____	____
14	________	____	____	____
15	________	____	____	____
16	________	____	____	____

Worksheet 20—AEA Port to Port Set Map

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

AEA Port to Port Set Map

TA (HG = 26)	0	1	2	3	4	5	6	7
(0-7)	___	___	___	___	___	___	___	___
(8-15)	___	___	___	___	___	___	___	___
(16-23)	___	___	___	___	___	___	___	___
(24-31)	___	___	___	___	___	___	___	___

	0	1	2	3	4	5	6	7
AEA 1 (HG = 21):	___	___	___	___	___	___	___	___
AEA 2 (HG = 22):	___	___	___	___	___	___	___	___
AEA 3 (HG = 23):	___	___	___	___	___	___	___	___

Worksheet 21—AEA Station Set

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

AEA Station Set

721 - ________	722 - ☐☐	723 - ☐☐☐☐☐☐☐☐				
	—	—				
725 - ☐						
1						
731 - ☐	732 - ☐	733 - ☐	734 - ☐	735 - ☐	736 - ☐	737 - ☐
1	1	0	—	0	1	
741 - ☐☐☐	742 - ☐☐☐	743 - ☐				
0 0 0	0 1 5	1				
751 - ☐	752 - ________					
—						
761 - ☐	762 - ☐	763 - ☐	764 - ☐			
1	1	1	1			
771 - ☐	772 - ☐	773 - ☐	774 - ☐	775 - ☐		
1	1	1	1	1		
781 - ☐	782 - ☐	783 - ☐☐☐	785 - ☐☐☐☐☐☐☐☐			
0	0	0 6 6	1 1 0 1 1 0 0 0			

721: Station Set Name
722: Station Type
723: Port Set Name
725: Host Connection Menu Option
731: Flow Control Type
732: XON/XOFF Transmission Resumption Trigger
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
751: Terminal Type Supported by the ASCII Host
752: ASCII Host Phone Number
761: Auto XON/XOFF
762: Wraparound Option
763: New Line Option
764: Margin Bell
771: Automatic Line Feed for Cursor Control
772: Carriage Return/Carriage Return - Line Feed Selection
773: Automatic New Line for Cursor Control
774: Scrolling
775: Line Turnaround Character
781: Attached Printer Prompt
782: Use of Form Feed
783: Page Length
785: AEA Printer Options

Worksheet 22—AEA Default Destination

Chapter 12 of the *3174 Planning Guide* contains the planning information needed.

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 23—Multiple Logical Terminals

Chapter 6 of the *3174 Planning Guide* contains the planning information needed.

Controller Port Number	Device Type/ Screen Size	Number of Sessions	7232? Y/N	EAB? Y/N	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					
			Total MLT Storage Required:		

Worksheet 24—Common SNA

Chapter 11 of the *3174 Planning Guide* contains the planning information needed.

Common SNA

500 - ☐
0

501 - ☐☐☐☐☐☐☐☐

502 - ☐☐☐☐☐☐☐☐

500: CSCM Unique
501: Network ID (NETID)
502: Logical Unit Name (LUNAME)

Non-Katakana Converged Keyboards

Chapter 15 of the *3174 Planning Guide* contains the planning information needed.

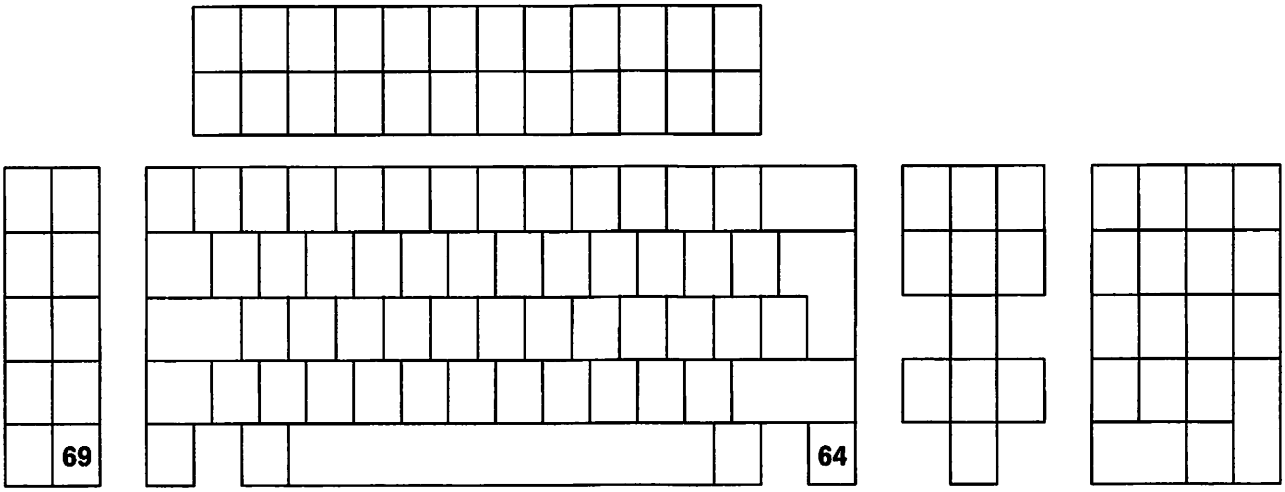
Language: ____________________

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.

Katakana Converged Keyboards

Chapter 15 of the *3174 Planning Guide* contains the planning information needed.

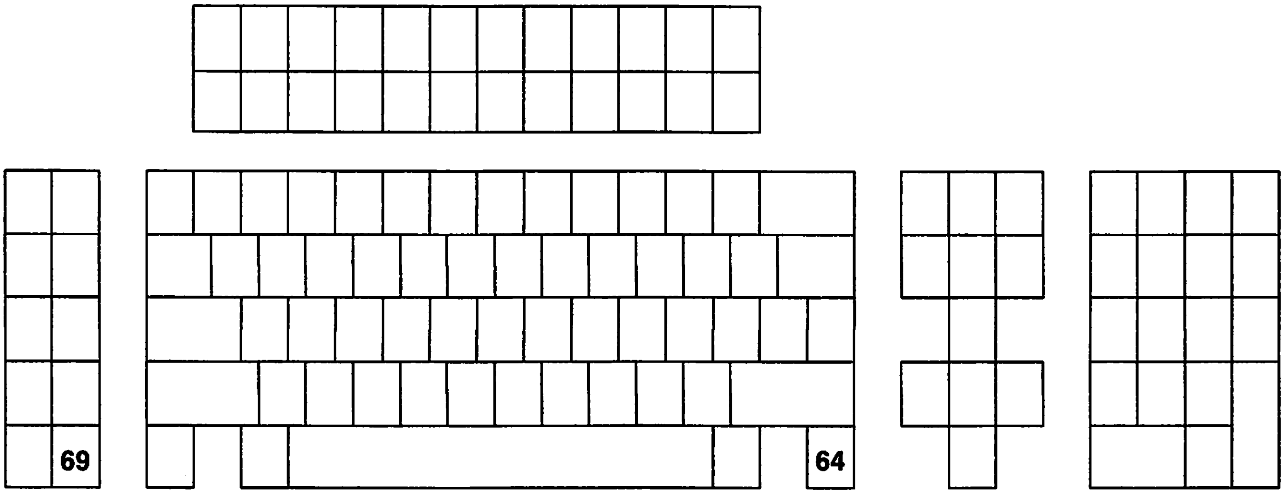
Language: ____________________

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 (U.S.)

Chapter 15 of the *3174 Planning Guide* contains the planning information needed.

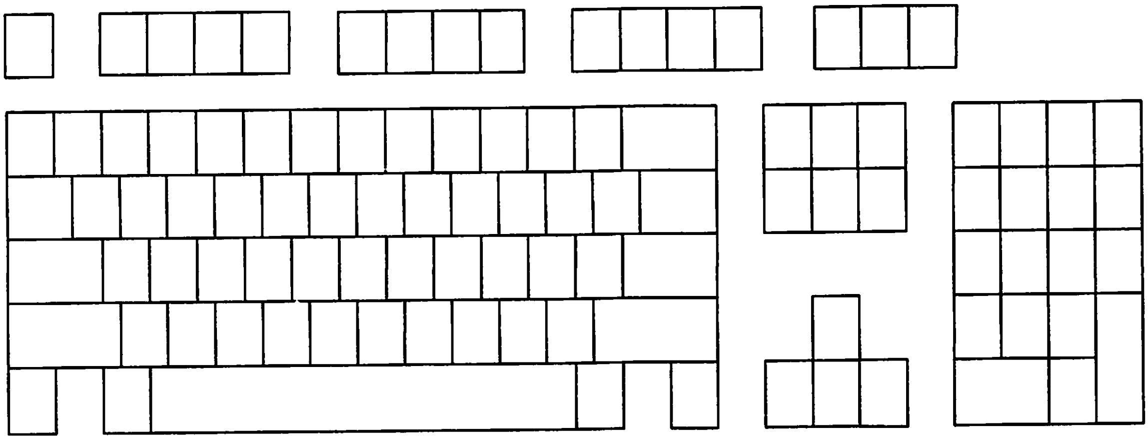
Language: ____________________

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 15 of the *3174 Planning Guide* contains the planning information needed.

Language:

____

Keyboard ID:

A B C D
(circle one)

Modify Field:

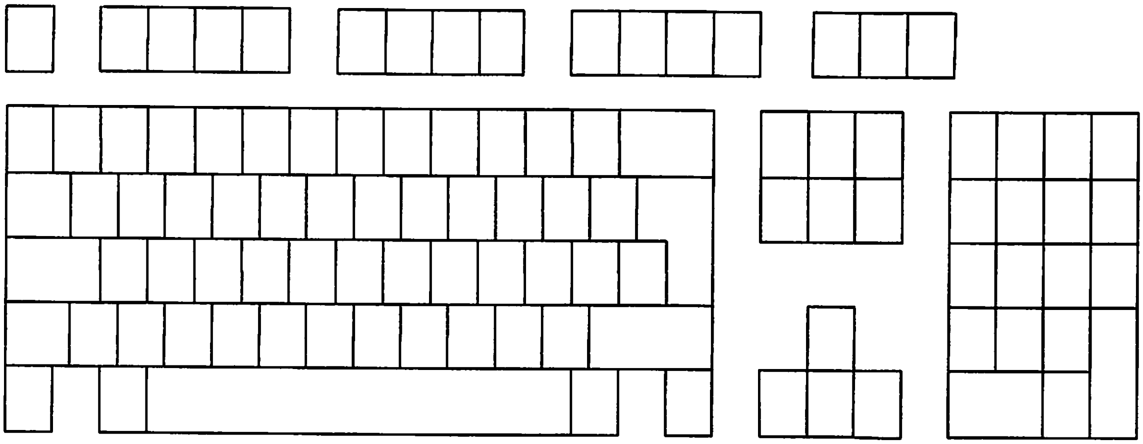
☐ 1 = New Layout
☐ 2 = Update

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 15 of the *3174 Planning Guide* contains the planning information needed.

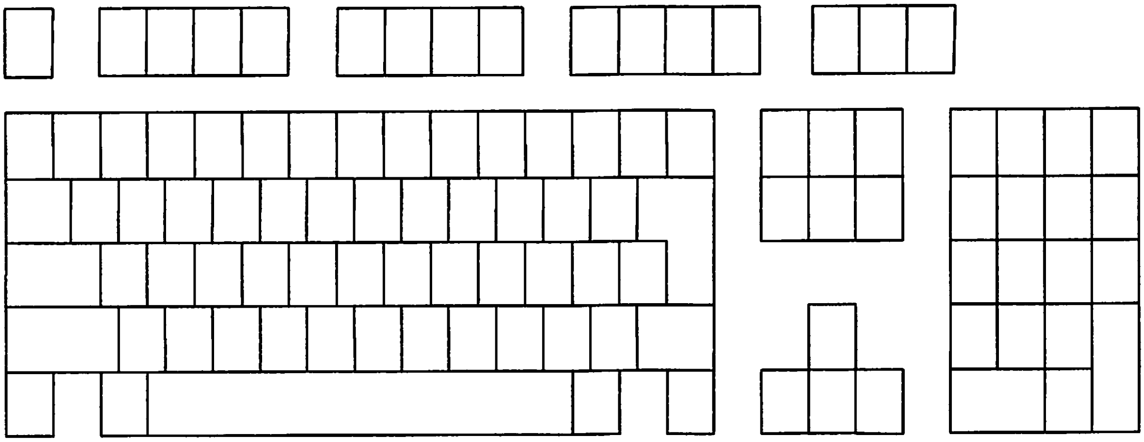
Language: ____________________

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.

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 will be 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 EIA 232D cables
- 17 limited-distance modem pairs
- 17 twisted-pair cable runs to connect LDM pairs
- Three Asynchronous Emulation Adapters and 17 EIA 232D cables.

3174 Attachment Diagrams

Once we have determined the number of ports needed, the modem type(s), 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.

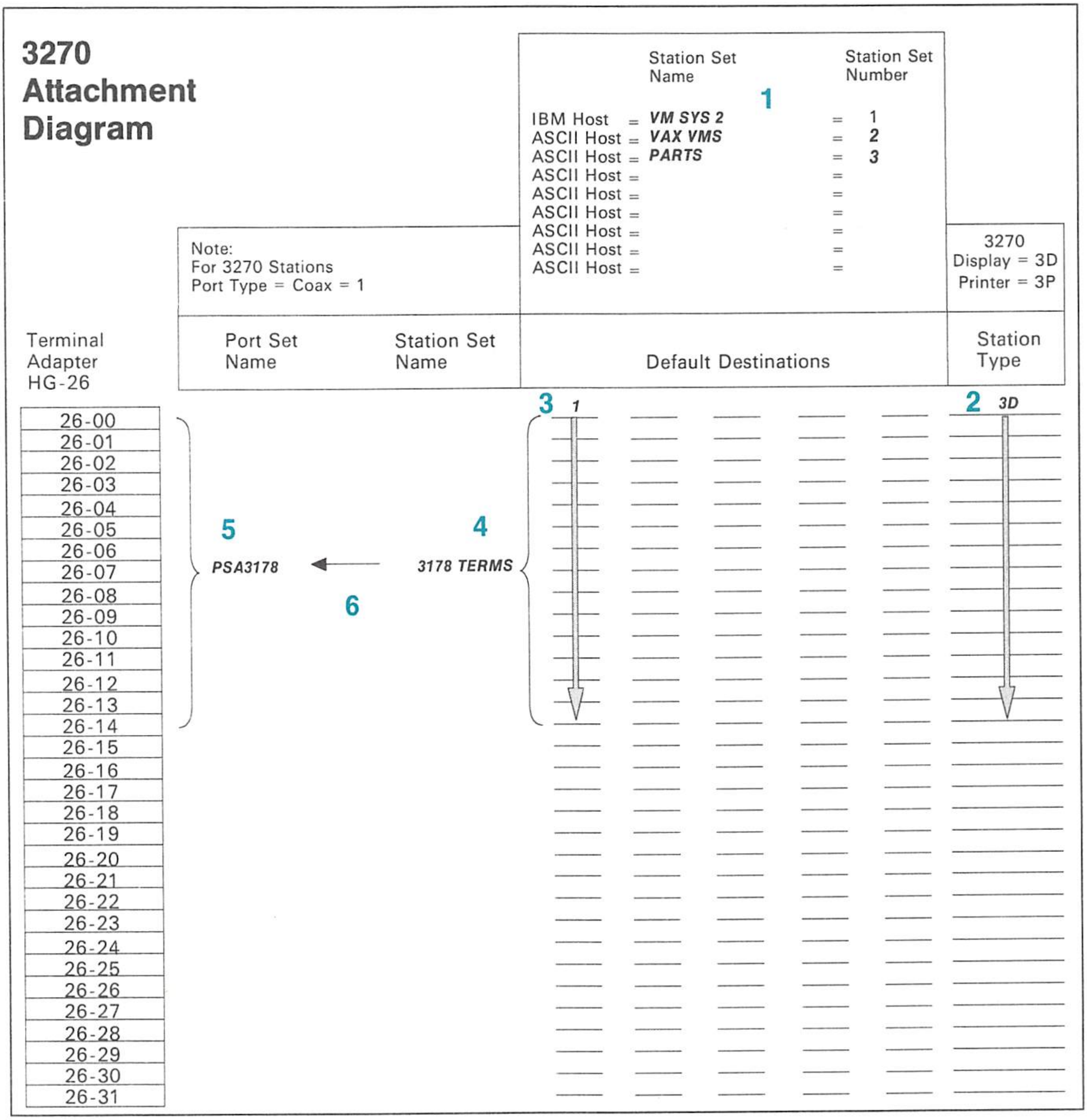
See Figures B-1 and B-2 for sample attachment diagrams for the first controller (C1). We have filled in portions of the diagrams; these portions are printed in bold italic. The diagrams have been filled in by (1) identifying the stations and station sets, (2) identifying the ports and port sets, and 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.



3270 Attachment Diagram

	Station Set Name		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 =		=	

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
26-00	*PSA3178*	*3178 TERMS*	*1*	*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				
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:

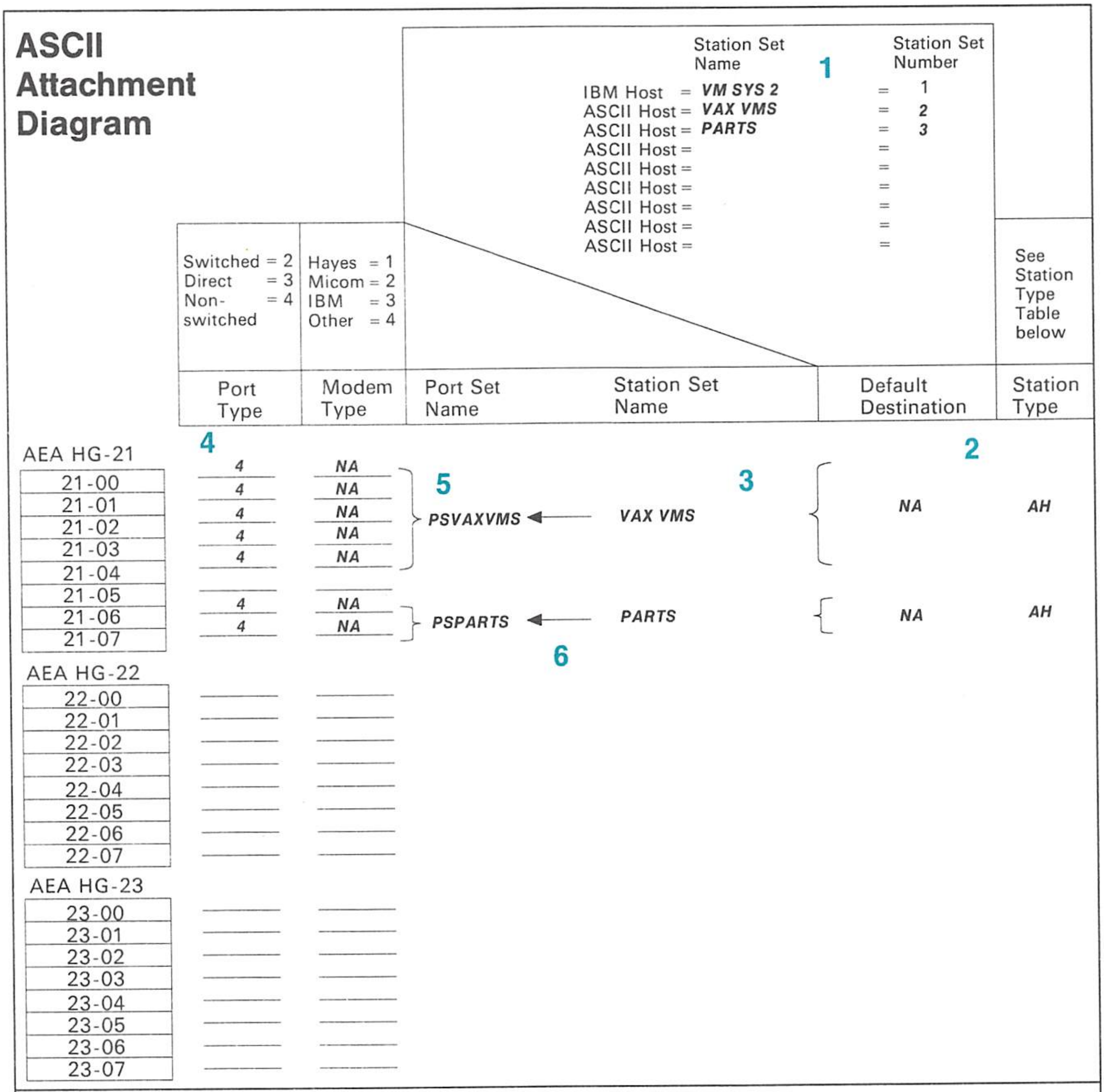
1. Written in the names of the available hosts (VMSYS2, VAX VMS, and PARTS), and numbered VAX VMS and PARTS as station sets 2 and 3, respectively.
2. Written in the ASCII station types (AH and AH); default destination does not apply (NA) to an AH.
3. Added brackets around each AH, and assigned the station 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 not only have the same port type but will be assigned to a designated DEC application; all ports in our system have the same port type, 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 EIA 232D cables, limited-distance modems, twisted-pair cabling, and any required distribution frame cross-connections.



ASCII Attachment Diagram

Station Set Name / 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 = =

Port Type: Switched = 2, Direct = 3, Non-switched = 4

Modem Type: Hayes = 1, Micom = 2, IBM = 3, Other = 4

Station Type: See Station Type Table below

	Port Type	Modem Type	Port Set Name	Station Set Name	Default Destination	Station Type
AEA HG-21						
21-00	4	NA	PSVAXVMS ←	VAX VMS	NA	AH
21-01	4	NA				
21-02	4	NA				
21-03	4	NA				
21-04	4	NA				
21-05						
21-06	4	NA	PSPARTS ←	PARTS	NA	AH
21-07	4	NA				
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	IBM PC-FTTERM Color	= FC	Lear Siegler ADM 11/12	= L1	TeleVideo 912	= T1
ASCII Printer	= AP	IBM PC-FTTERM Mono	= FM	Lear Siegler ADM 3A/5	= L3	TeleVideo 970	= T7
ADDS Viewpoint A2	= A2	Hewlett-Packard 2621B	= H2	Lear Siegler ADM 1178	= L7	DEC VT100	= V1
ADDS Viewpoint/78	= A7	IBM 3101	= I1	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
Hazeltine 1500	= E1	IBM 3161/3163	= I3			DEC VT52	= V5
Esprit Executive 10/78	= E7	IBM 3164	= I4				

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.

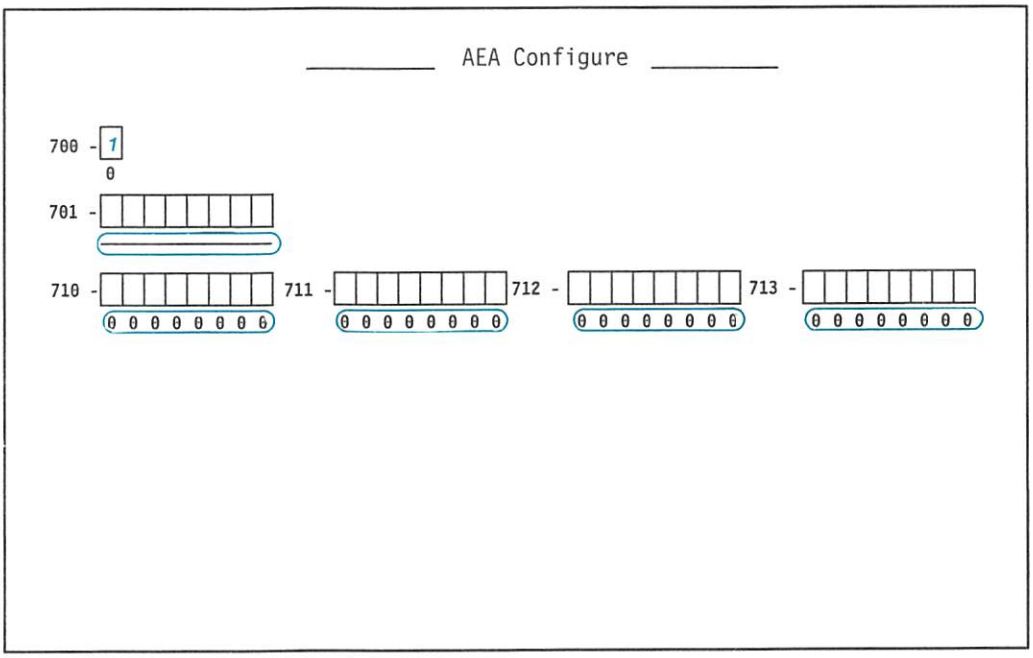
When a default response for a configuration question did not meet the requirements of our network, an alternate response was written on the worksheet. Use of the default response was indicated by circling it.

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 12, "Planning for the Asynchronous Emulation Adapter."

AEA Configure Worksheet

On the following worksheet, we have filled in question 700 with a **1**.



AEA Configure

700 - 1
0

701 - ☐☐☐☐☐☐☐☐
[✓ ________]

710 - ☐☐☐☐☐☐☐☐
[✓ 0 0 0 0 0 0 0 0]

711 - ☐☐☐☐☐☐☐☐
[✓ 0 0 0 0 0 0 0 0]

712 - ☐☐☐☐☐☐☐☐
[✓ 0 0 0 0 0 0 0 0]

713 - ☐☐☐☐☐☐☐☐
[✓ 0 0 0 0 0 0 0 0]

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
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

TA (HG = 26)	0	1	2	3	4	5	6	7
(0-7)	1	1	1	1	1	1	1	1
(8-15)	1	1	1	1	1	1	1	
(16-23)								
(24-31)								

	0	1	2	3	4	5	6	7
AEA 1 (HG = 21):	2	2	2	2	2		3	3
AEA 2 (HG = 22):								
AEA 3 (HG = 23):								

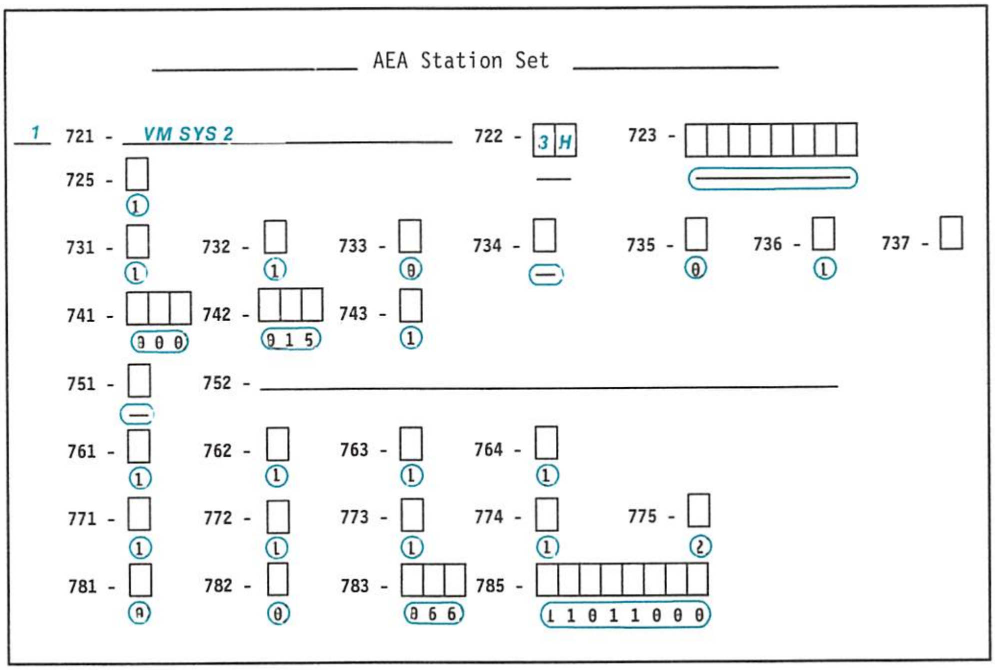
AEA Station Set Worksheets

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.



AEA Station Set

1 721 - VM SYS 2 722 - 3H 723 - —

725 - 1

731 - 1 732 - 1 733 - 0 734 - — 735 - 0 736 - 1 737 -

741 - 000 742 - 015 743 - 1

751 - — 752 -

761 - 1 762 - 1 763 - 1 764 - 1

771 - 1 772 - 1 773 - 1 774 - 1 775 - 2

781 - 0 782 - 0 783 - 066 785 - 11011000

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.

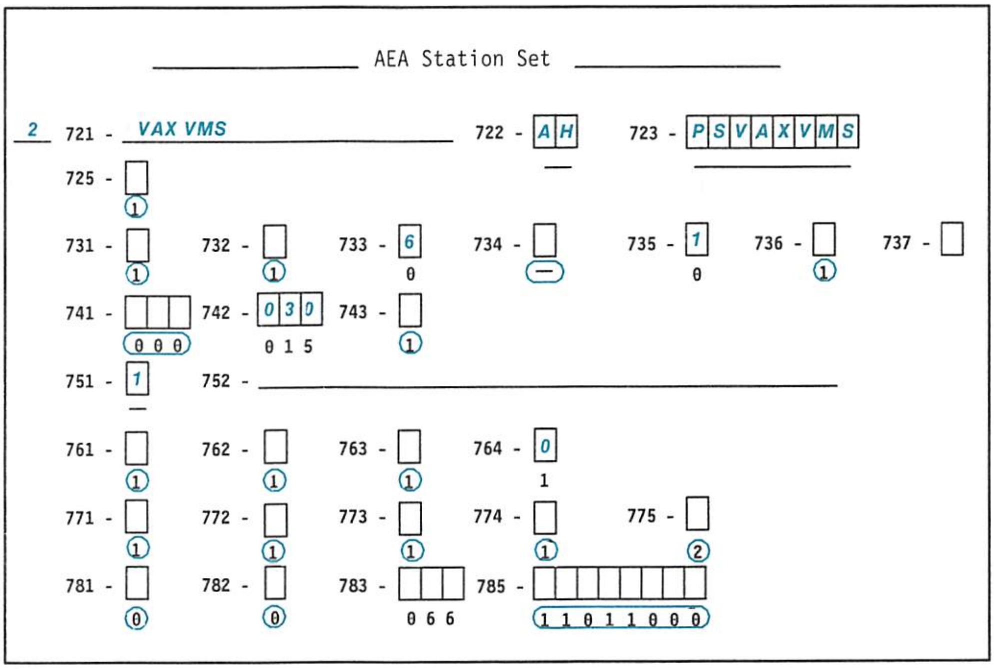
733 Line speed. We have specified **6** to indicate a line speed of 9600 bps.

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.



AEA Station Set

2 721 - VAX VMS   722 - AH   723 - PSVAXVMS

725 - ☐ ①

731 - ☐ ①   732 - ☐ ①   733 - 6 (0)   734 - ☐ (–)   735 - 1 (0)   736 - ☐ ①   737 - ☐

741 - ☐☐☐ (000)   742 - 030 (015)   743 - ☐ ①

751 - 1   752 - ____________________

761 - ☐ ①   762 - ☐ ①   763 - ☐ ①   764 - 0 (1)

771 - ☐ ①   772 - ☐ ①   773 - ☐ ①   774 - ☐ ①   775 - ☐ ②

781 - ☐ ⓪   782 - ☐ ⓪   783 - ☐☐☐ (066)   785 - ☐☐☐☐☐☐☐☐ (11011000)

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.

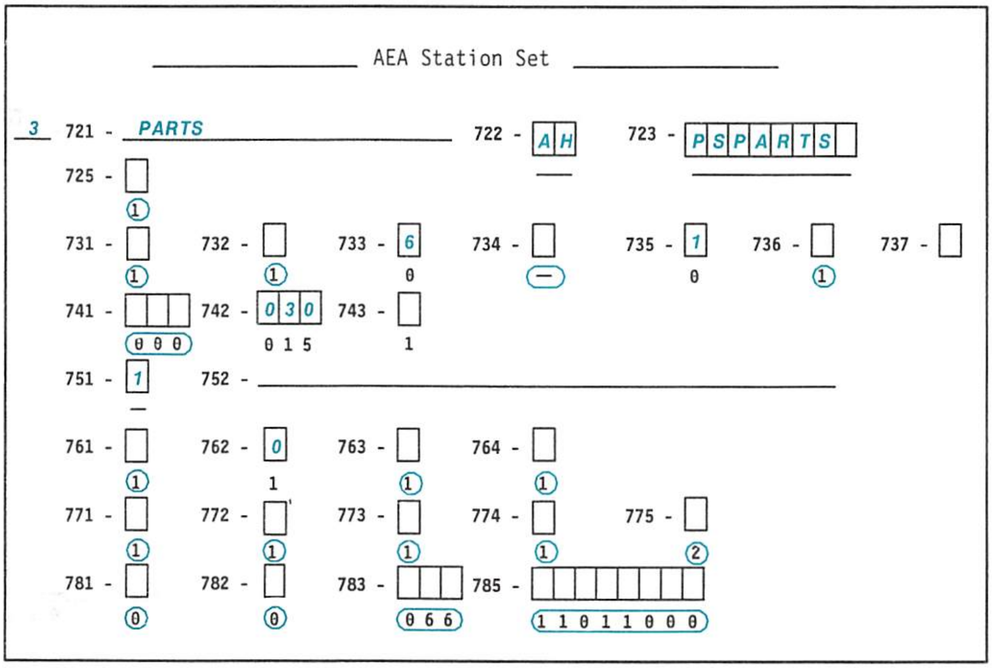
733 Line speed. We have specified **6** to indicate a line speed of 9600 bps.

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.



```
                   AEA Station Set

3  721 - PARTS                        722 - AH       723 - PSPARTS
   725 - ☐
         ①
   731 - ☐    732 - ☐    733 - 6    734 - ☐     735 - 1    736 - ☐    737 - ☐
         ①          ①          0         (—)          0          ①
   741 - ☐☐☐  742 - 030  743 - ☐
        (0 0 0)     0 1 5      1
   751 - 1    752 - ____________________________________
   761 - ☐    762 - 0    763 - ☐    764 - ☐
         ①          1          ①          ①
   771 - ☐    772 - ☐    773 - ☐    774 - ☐     775 - ☐
         ①          ①          ①          ①           ②
   781 - ☐    782 - ☐    783 - ☐☐☐  785 - ☐☐☐☐☐☐☐☐
         ⓪          ⓪        (0 6 6)     (1 1 0 1 1 0 0 0)
```

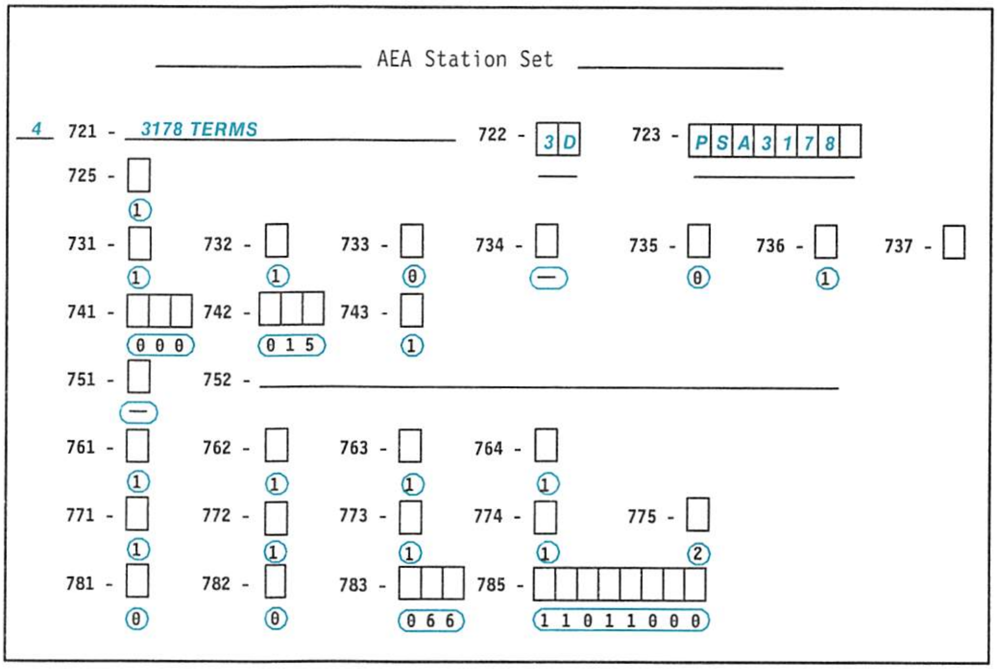
Figure B-5. AEA Station Set Worksheet—PARTS

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.



AEA Station Set

4 721 - 3178 TERMS 722 - 3D 723 - PSA3178

725 - ☐ ①

731 - ☐ ① 732 - ☐ ① 733 - ☐ ⓪ 734 - ☐ (—) 735 - ☐ ⓪ 736 - ☐ ① 737 - ☐

741 - ☐☐☐ (0 0 0) 742 - ☐☐☐ (0 1 5) 743 - ☐ ①

751 - ☐ (—) 752 - ____

761 - ☐ ① 762 - ☐ ① 763 - ☐ ① 764 - ☐ ①

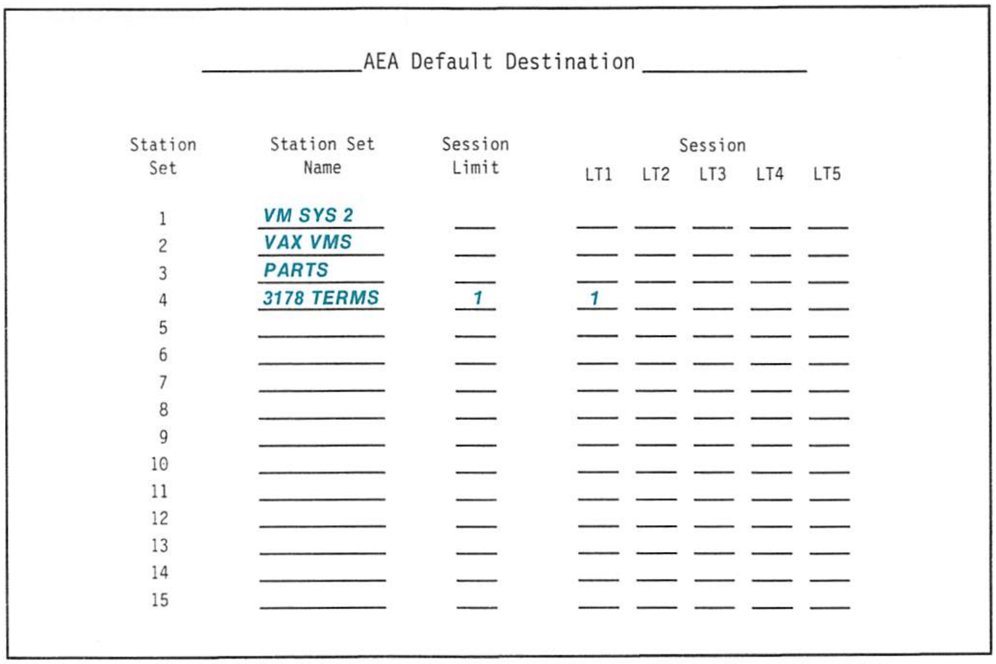
771 - ☐ ① 772 - ☐ ① 773 - ☐ ① 774 - ☐ ① 775 - ☐ ②

781 - ☐ ⓪ 782 - ☐ ⓪ 783 - ☐☐☐ (0 6 6) 785 - ☐☐☐☐☐☐☐☐ (1 1 0 1 1 0 0 0)

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 Set	Station Set Name	Session Limit	Session				
			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 out the worksheets. Refer to Chapter 12, "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.

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[1] Trademark of Digital Equipment Corporation.

Hardware Requirements

- Six Asynchronous Emulation Adapters (one per controller)
- 40 EIA 232D cables
- 40 modems
- 40 telephone circuits

3174 Attachment Diagrams

Once we have determined the number of ports needed, the modem type(s), 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

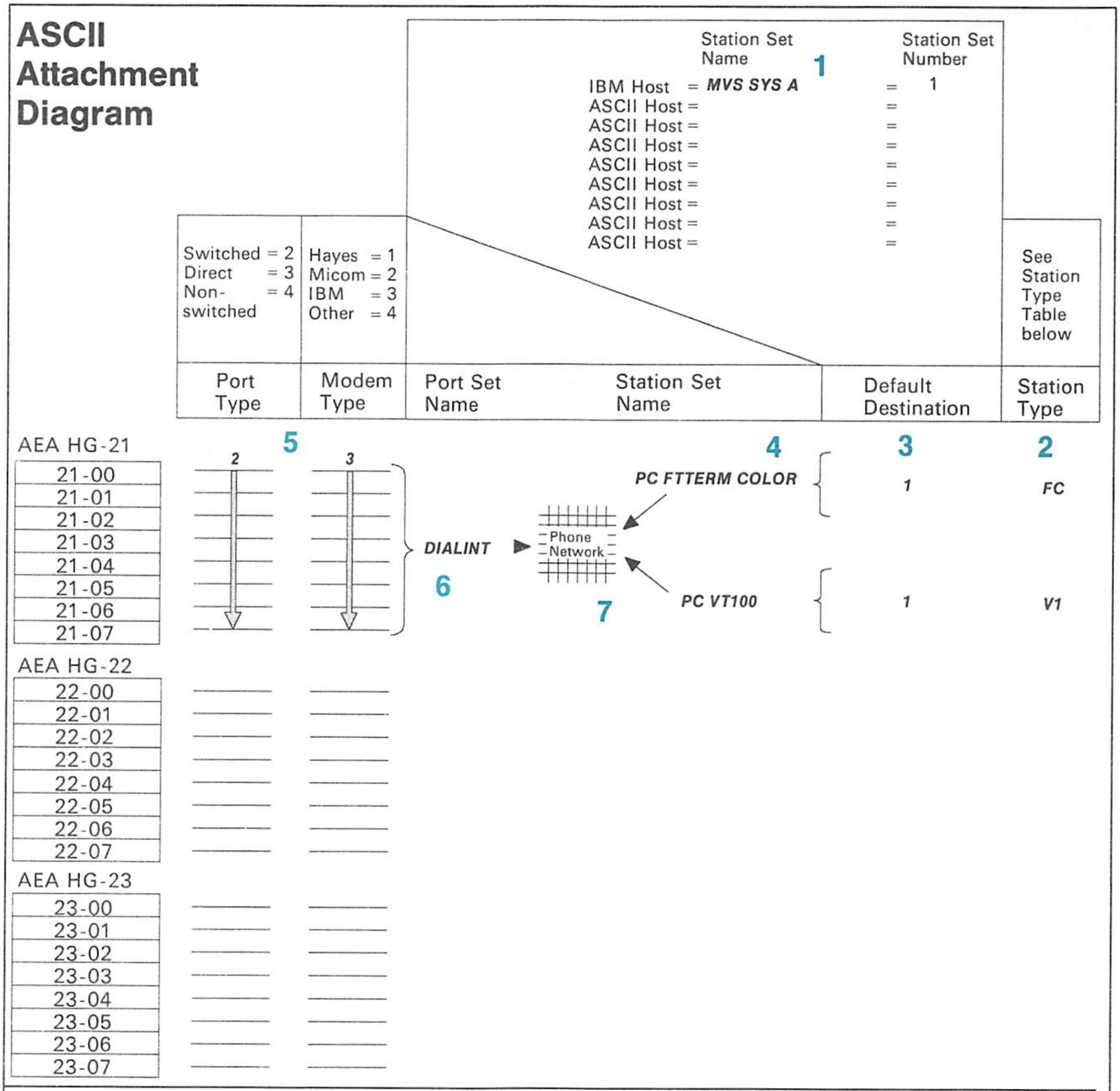
For the ASCII Attachment Diagram, we have:

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 and Modem Type, 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 EIA 232D cables, modems, and telephone connections.



Station Type Table

ASCII Host	= AH	IBM PC-FTTERM Color	= FC	Lear Siegler ADM 11/12	= L1	TeleVideo 912	= T1
ASCII Printer	= AP	IBM PC-FTTERM Mono	= FM	Lear Siegler ADM 3A/5	= L3	TeleVideo 970	= T7
ADDS Viewpoint A2	= A2	Hewlett-Packard 2621B	= H2	Lear Siegler ADM 1178	= L7	DEC VT100	= V1
ADDS Viewpoint/78	= A7	IBM 3101	= I1	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
Hazeltine 1500	= E1	IBM 3161/3163	= I3			DEC VT52	= V5
Esprit Executive 10/78	= E7	IBM 3164	= I4				

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.

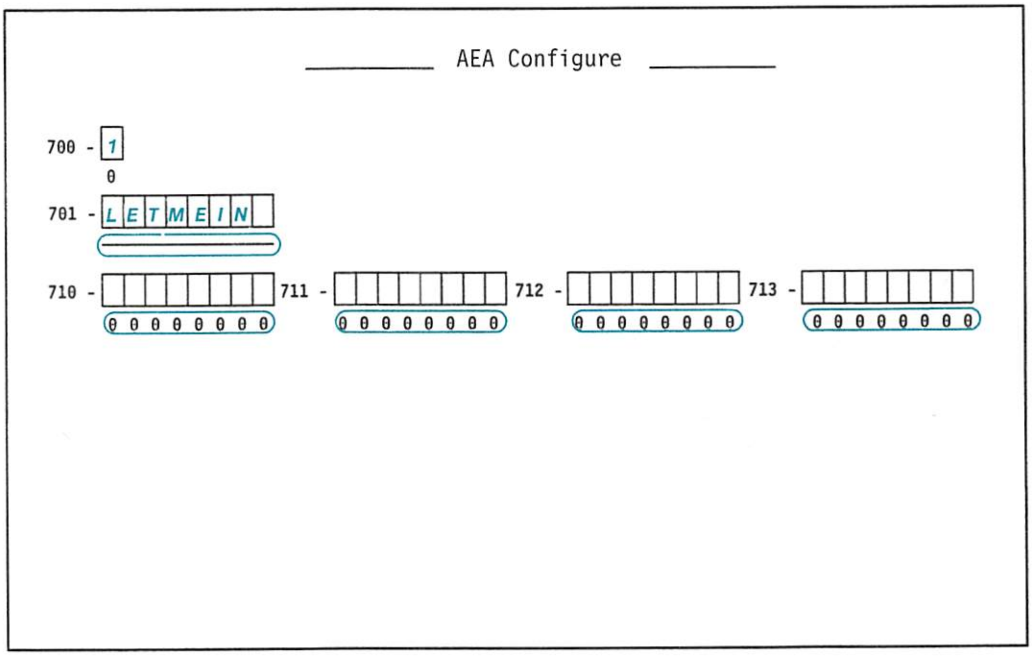
Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Note: 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 Terminal (MLT) support. Refer to Chapter 7, "Planning for Port Assignment" for information on the Port Assignment Worksheet.

For detailed information on how to fill out the worksheets, refer to Chapter 12, "Planning for the Asynchronous Emulation Adapter."

AEA Configure Worksheet

On the following worksheet, we have filled in question 700 with a **1** and 701 (password) with **LETMEIN**.



AEA Configure

700 - 1
0

701 - LETMEIN

710 - [✓ 0 0 0 0 0 0 0 0]
711 - [✓ 0 0 0 0 0 0 0 0]
712 - [✓ 0 0 0 0 0 0 0 0]
713 - [✓ 0 0 0 0 0 0 0 0]

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
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

TA (HG = 26)	0	1	2	3	4	5	6	7
(0-7)								
(8-15)								
(16-23)								
(24-31)								

	0	1	2	3	4	5	6	7
AEA 1 (HG = 21):	1	1	1	1	1	1	1	1
AEA 2 (HG = 22):								
AEA 3 (HG = 23):								

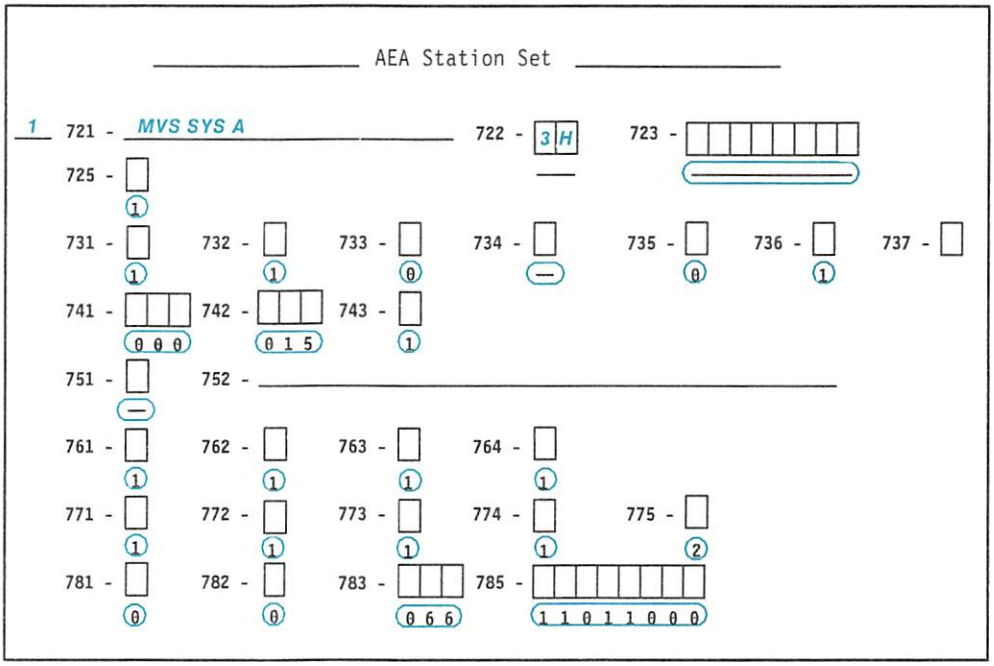
AEA Station Set Worksheets

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.



AEA Station Set

1 721 - MVS SYS A 722 - 3H 723 - ☐☐☐☐☐☐☐☐ (—)

725 - ☐ ①

731 - ☐ ① 732 - ☐ ① 733 - ☐ ⓪ 734 - ☐ (—) 735 - ☐ ⓪ 736 - ☐ ① 737 - ☐

741 - ☐☐☐ (0 0 0) 742 - ☐☐☐ (0 1 5) 743 - ☐ ①

751 - ☐ (—) 752 - ____

761 - ☐ ① 762 - ☐ ① 763 - ☐ ① 764 - ☐ ①

771 - ☐ ① 772 - ☐ ① 773 - ☐ ① 774 - ☐ ① 775 - ☐ ②

781 - ☐ ⓪ 782 - ☐ ⓪ 783 - ☐☐☐ (0 6 6) 785 - ☐☐☐☐☐☐☐☐ (1 1 0 1 1 0 0 0)

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.

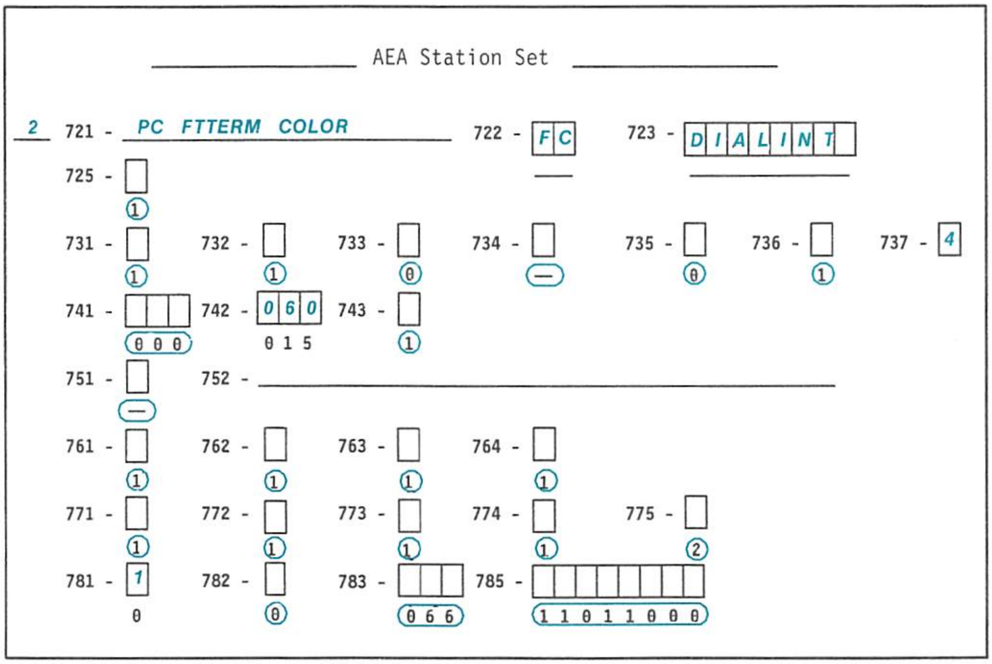
737 Maximum modem line speed. We have specified a **4** to indicate a maximum modem line speed of 2400 bps (maximum speed supported by the IBM 5842).

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.



AEA Station Set

2 721 - PC FTTERM COLOR 722 - FC 723 - DIALINT
725 - ☐ ①
731 - ☐ ① 732 - ☐ ① 733 - ☐ ⓪ 734 - ☐ (—) 735 - ☐ ⓪ 736 - ☐ ① 737 - 4
741 - ☐☐☐ (0 0 0) 742 - 060 0 1 5 743 - ☐ ①
751 - ☐ (—) 752 - ____
761 - ☐ ① 762 - ☐ ① 763 - ☐ ① 764 - ☐ ①
771 - ☐ ① 772 - ☐ ① 773 - ☐ ① 774 - ☐ ① 775 - ☐ ②
781 - 1 0 782 - ☐ ⓪ 783 - ☐☐☐ (0 6 6) 785 - ☐☐☐☐☐☐☐☐ (1 1 0 1 1 0 0 0)

Figure B-10. AEA station Set Worksheet—PC FTTERM COLOR

PC VT100: These are the remote PC's 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 again 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.

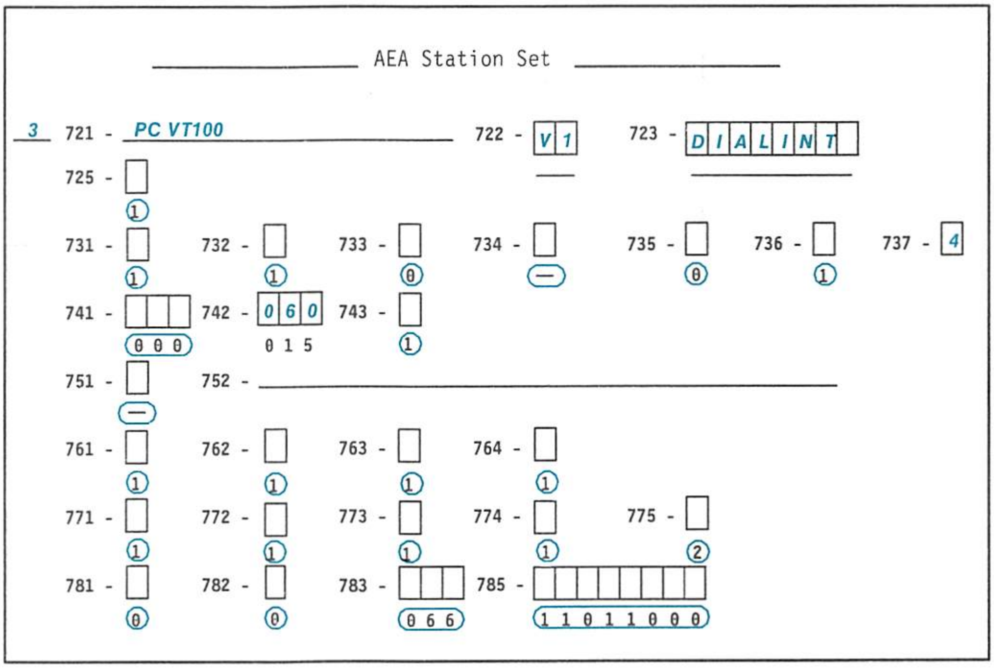
721 Station set name. We have specified **PC VT100** as the name of the station set.

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.



AEA Station Set

3 721 - PC VT100 722 - V1 723 - DIALINT
725 - ☐ ①
731 - ☐ ① 732 - ☐ ① 733 - ☐ ⓪ 734 - ☐ (–) 735 - ☐ ⓪ 736 - ☐ ① 737 - 4
741 - ☐☐☐ (0 0 0) 742 - 060 0 1 5 743 - ☐ ①
751 - ☐ (–) 752 - ____
761 - ☐ ① 762 - ☐ ① 763 - ☐ ① 764 - ☐ ①
771 - ☐ ① 772 - ☐ ① 773 - ☐ ① 774 - ☐ ① 775 - ☐ ②
781 - ☐ ⓪ 782 - ☐ ⓪ 783 - ☐☐☐ (0 6 6) 785 - ☐☐☐☐☐☐☐☐ (1 1 0 1 1 0 0 0)

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 Set	Station Set Name	Session Limit	Session				
			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 out the worksheets. Refer to Chapter 12, "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 EIA 232D cables per controller for LDMs and auto-call modems
- Twisted-pair wiring to each ASCII printer

3174 Attachment Diagrams

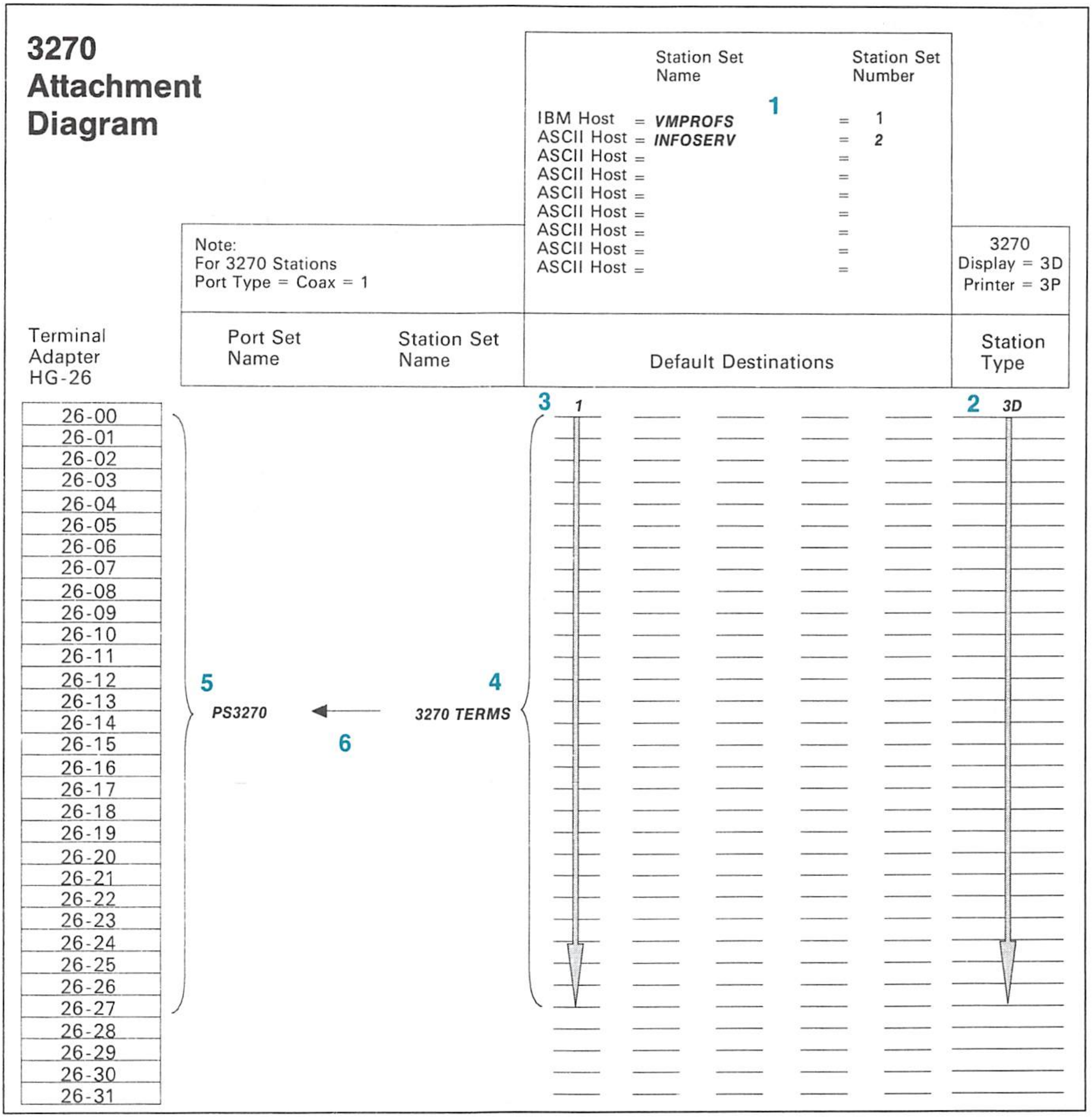
Once we have determined the number of ports needed, the modem type(s), and the method of connecting stations to the AEA ports, we can diagram the layout of the system and identify station sets and port sets. A system layout consists of a 3270 Attachment Diagram and an ASCII Attachment Diagram. These 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.



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 = =

Note:
For 3270 Stations
Port Type = Coax = 1

3270
Display = 3D
Printer = 3P

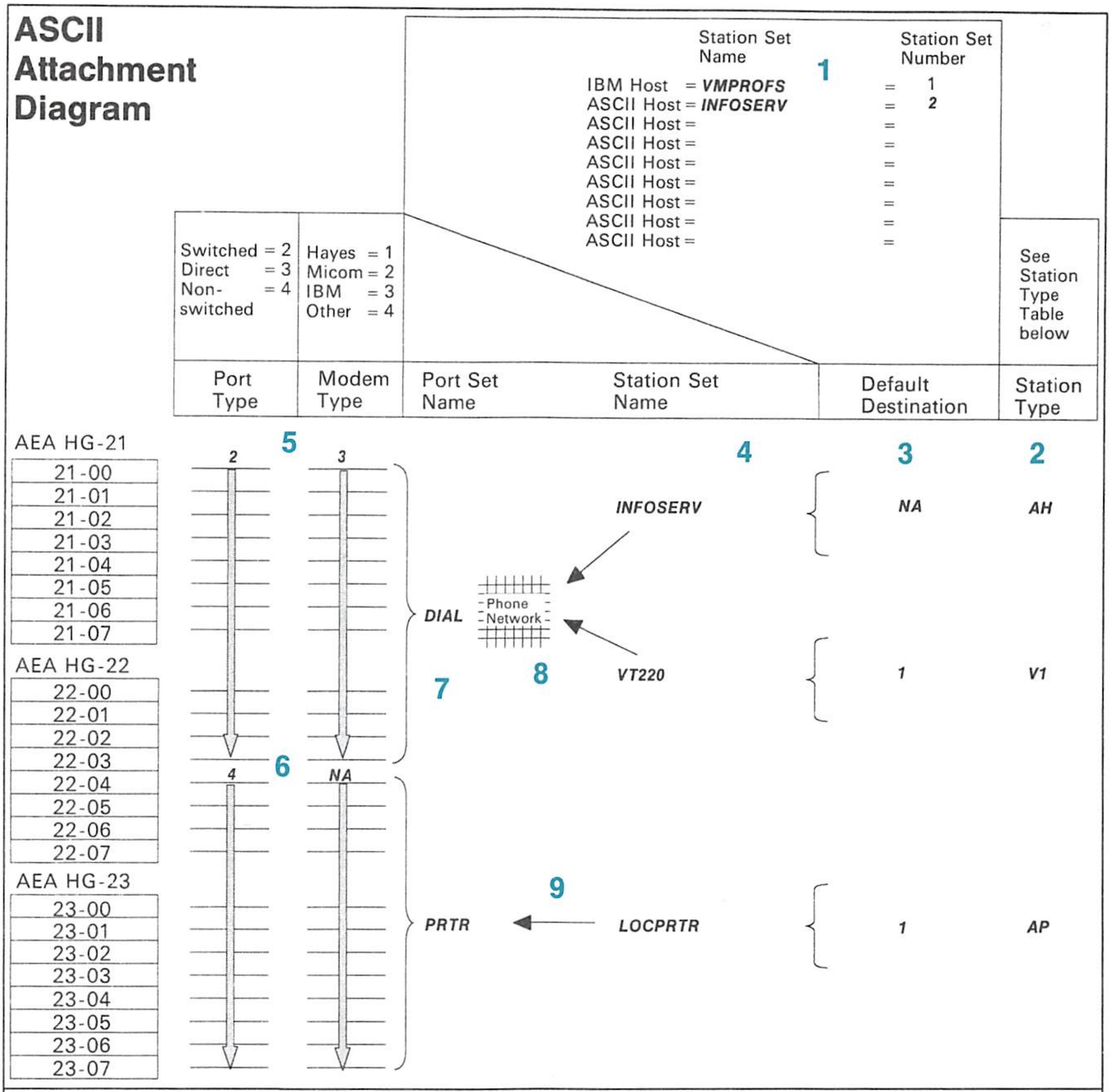
Terminal Adapter HG-26	Port Set Name	Station Set Name	Default Destinations	Station Type
26-00 – 26-27	*PS3270*	*3270 TERMS*	*1*	*3D*

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 and Modem Type, and assigned each group a port set name: DIAL for ports 21-00 – 22-03, and PRTR for ports 22-04 – 23-07.
8. Drawn a switched-line, phone network symbol, and added arrows to show that station sets INFOSERV and VT220 are served by the switched ports of port set DIAL.
9. Added an arrow to show that Station Set LOCPRTR is served by the non-switched ports of port set PRTR.



Station Type Table

ASCII Host	= AH	IBM PC-FTTERM Color	= FC	Lear Siegler ADM 11/12	= L1	TeleVideo 912	= T1
ASCII Printer	= AP	IBM PC-FTTERM Mono	= FM	Lear Siegler ADM 3A/5	= L3	TeleVideo 970	= T7
ADDS Viewpoint A2	= A2	Hewlett-Packard 2621B	= H2	Lear Siegler ADM 1178	= L7	DEC VT100	= V1
ADDS Viewpoint/78	= A7	IBM 3101	= I1	ANSI 3.64 Terminal	= S1	DEC VT241	= V2
Hazeltine 1500	= E1	IBM 3161/3163	= I3			DEC VT52	= V5
Esprit Executive 10/78	= E7	IBM 3164	= I4				

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 14, "Planning to Define the Printer Authorization Matrix (PAM)," 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 **DIALOUT** as the port set associated with station set ASCII HOST.

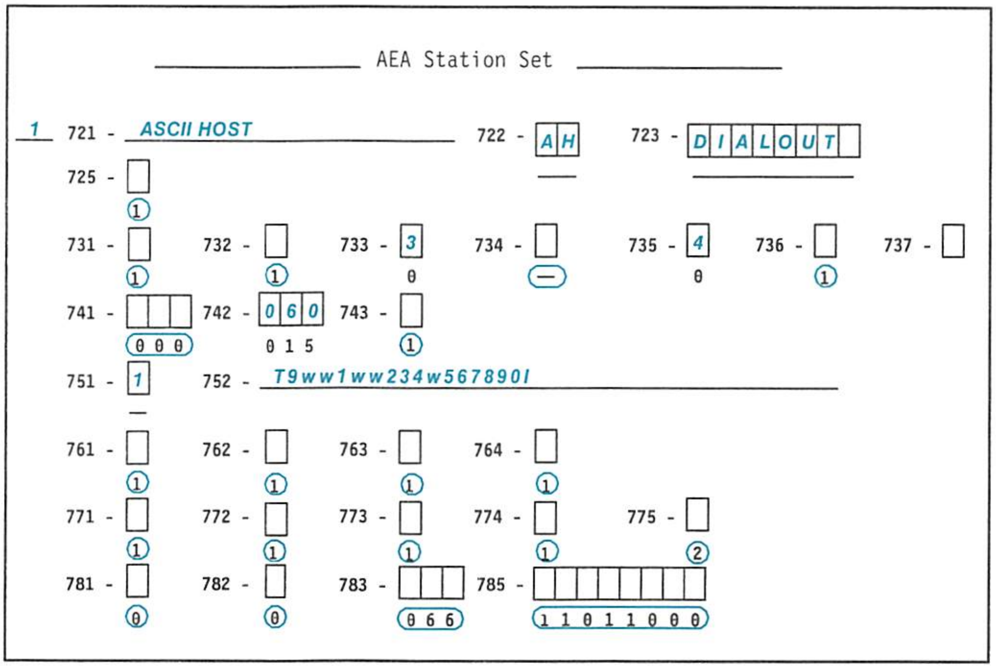
733 Line speed. We have specified **3** to indicate a line speed of 1200 bps.

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").



AEA Station Set

1 721 - ASCII HOST 722 - AH 723 - DIALOUT

725 - ☐ ①

731 - ☐ ① 732 - ☐ ① 733 - 3 0 734 - ☐ (—) 735 - 4 0 736 - ☐ ① 737 - ☐

741 - ☐☐☐ (0 0 0) 742 - 060 0 1 5 743 - ☐ ①

751 - 1 — 752 - T9ww1ww234w567890I

761 - ☐ ① 762 - ☐ ① 763 - ☐ ① 764 - ☐ ①

771 - ☐ ① 772 - ☐ ① 773 - ☐ ① 774 - ☐ ① 775 - ☐ ②

781 - ☐ ⓪ 782 - ☐ ⓪ 783 - ☐☐☐ (0 6 6) 785 - ☐☐☐☐☐☐☐☐ (1 1 0 1 1 0 0 0)

Figure B-15. AEA Station Set Worksheet—ASCII HOST

This is the end of the section describing filling out the worksheets. Refer to Chapter 12, "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
- 15 IBM 8550 personal computers attached to the local ring.

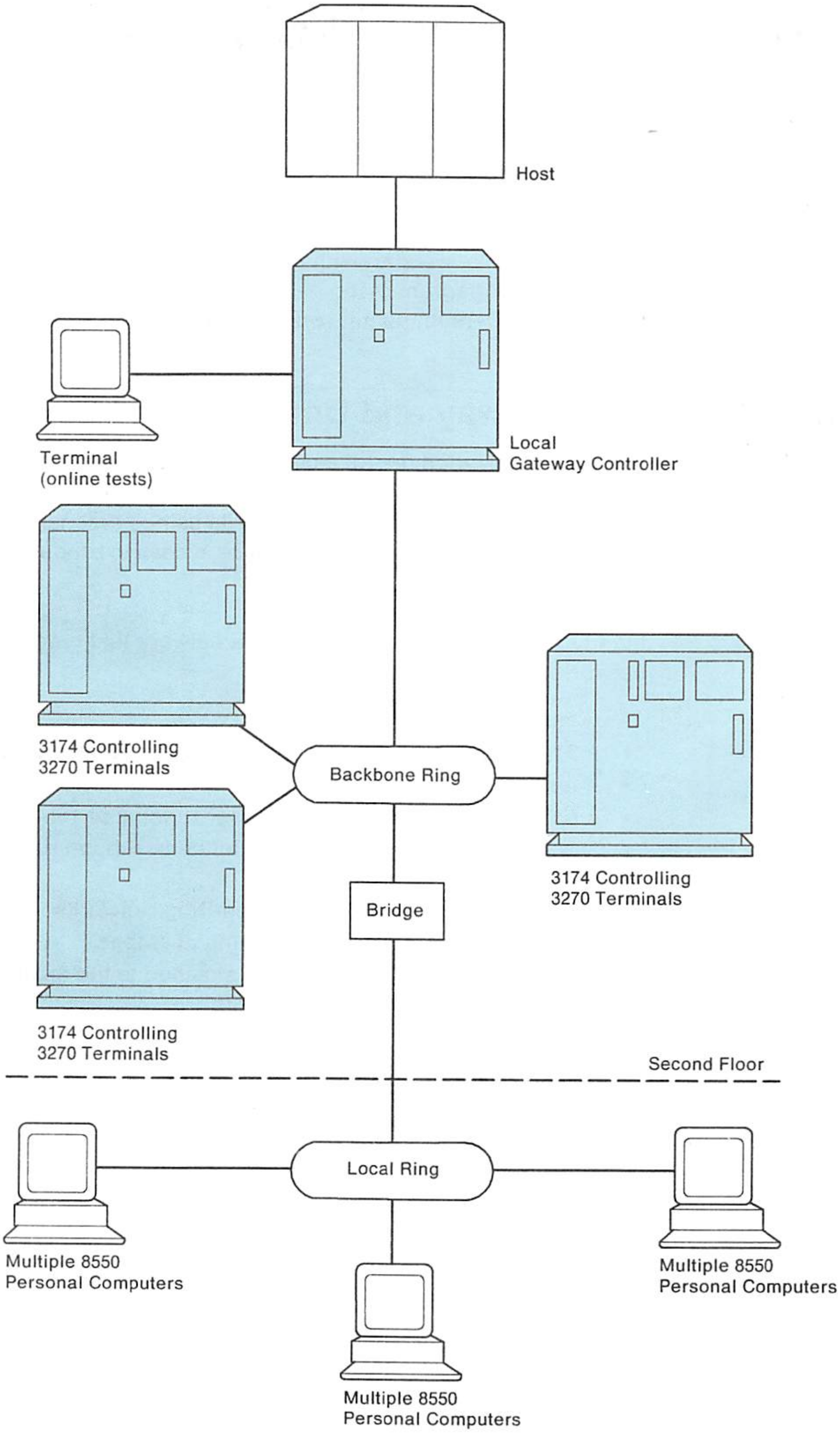


Figure C-1. Token-Ring Network – Local Gateway and Downstream 3174 13Rs

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—Local (SNA)"
- "Worksheet 9—Token-Ring Gateway"
- "Worksheet 10—Ring Address Assignment"
- "Worksheet 11—Ring Transmission Definition"
- "Worksheet 24—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.

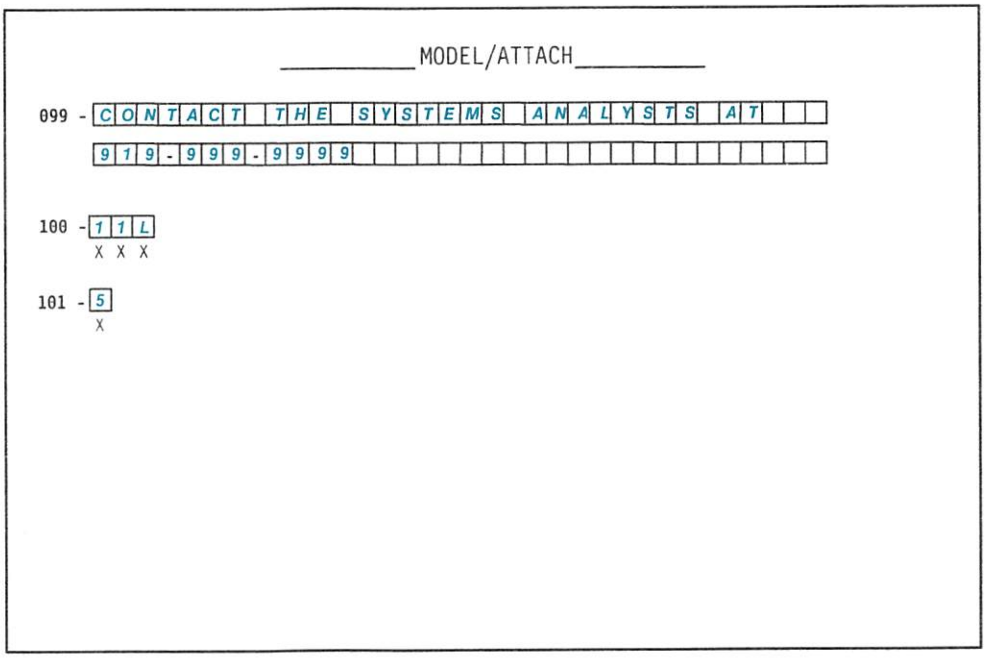
Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Host Attachment Worksheet – Local Gateway

On worksheet 1 (Figure C-2), we have written in responses to the following configuration questions:

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.



MODEL/ATTACH

099 - CONTACT THE SYSTEMS ANALYSTS AT
919-999-9999

100 - 11L
X X X

101 - 5
X

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.

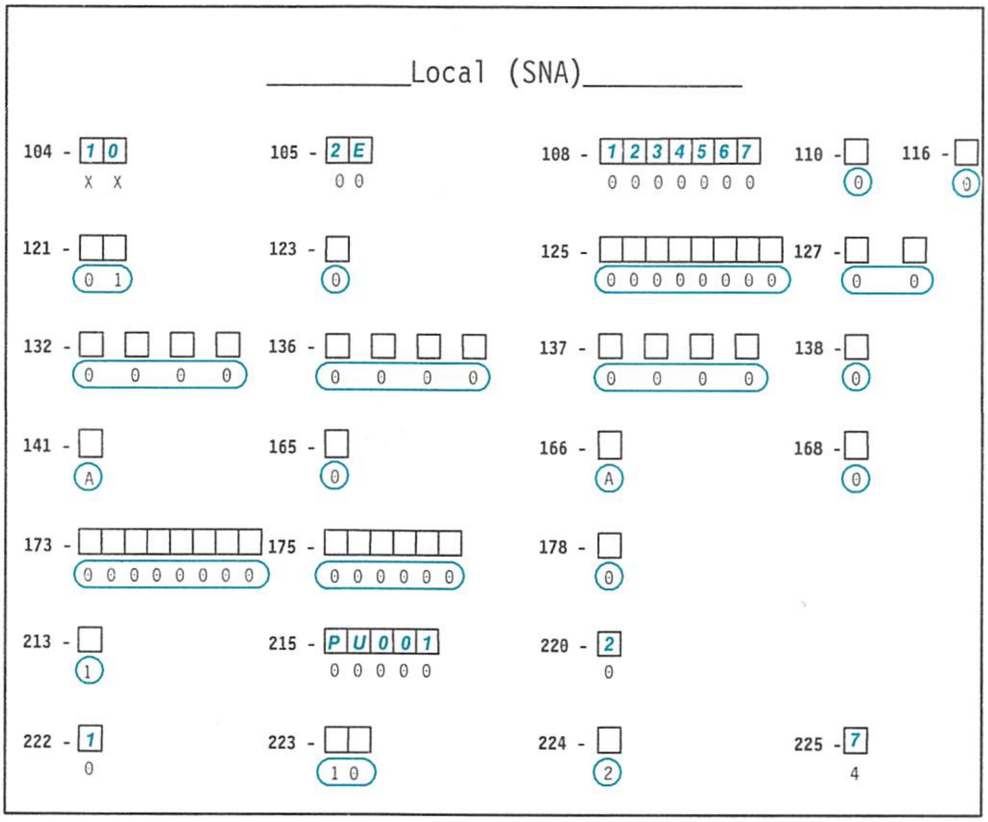
215 Physical unit identification. We have specified **PU001** as the host's identifier for our gateway.

220 Alert 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.



Local (SNA)

104 - 1 0 X X	105 - 2 E 0 0	108 - 1 2 3 4 5 6 7 0 0 0 0 0 0 0	110 - ☐ 0	116 - ☐ 0
121 - ☐☐ 0 1	123 - ☐ 0	125 - ☐☐☐☐☐☐☐☐ 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	178 - ☐ 0		
213 - ☐ 1	215 - P U 0 0 1 0 0 0 0 0	220 - 2 0		
222 - 1 0	223 - ☐☐ 1 0	224 - ☐ 2	225 - 7 4	

Figure C-3. Worksheet 7 – Local Gateway

Token-Ring Gateway Worksheet – Local Gateway

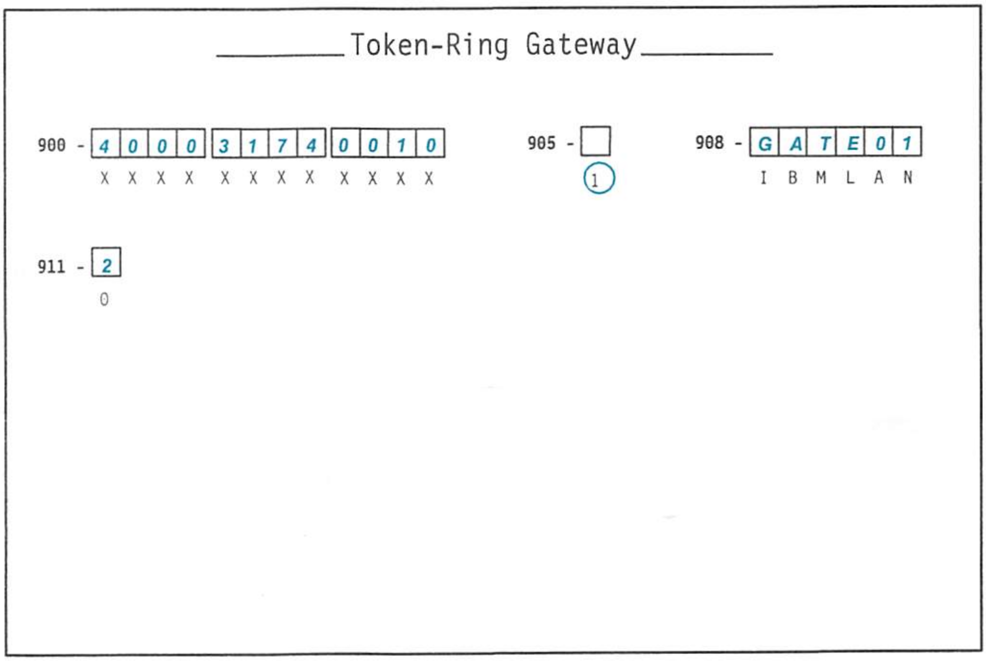
On worksheet 9 (Figure C-4), we have written in responses to the following configuration questions:

900 Token-Ring Network address for the gateway. The locally administered address **4000 3174 0010** was assigned to the gateway.

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 13 contains additional information on the questions that appear on this worksheet.



Token-Ring Gateway

900 - 4000 3174 0010
X X X X X X X X X X X X

905 - ☐
①

908 - GATE01
I B M L A N

911 - 2
0

Figure C-4. Worksheet 9 – Local Gateway

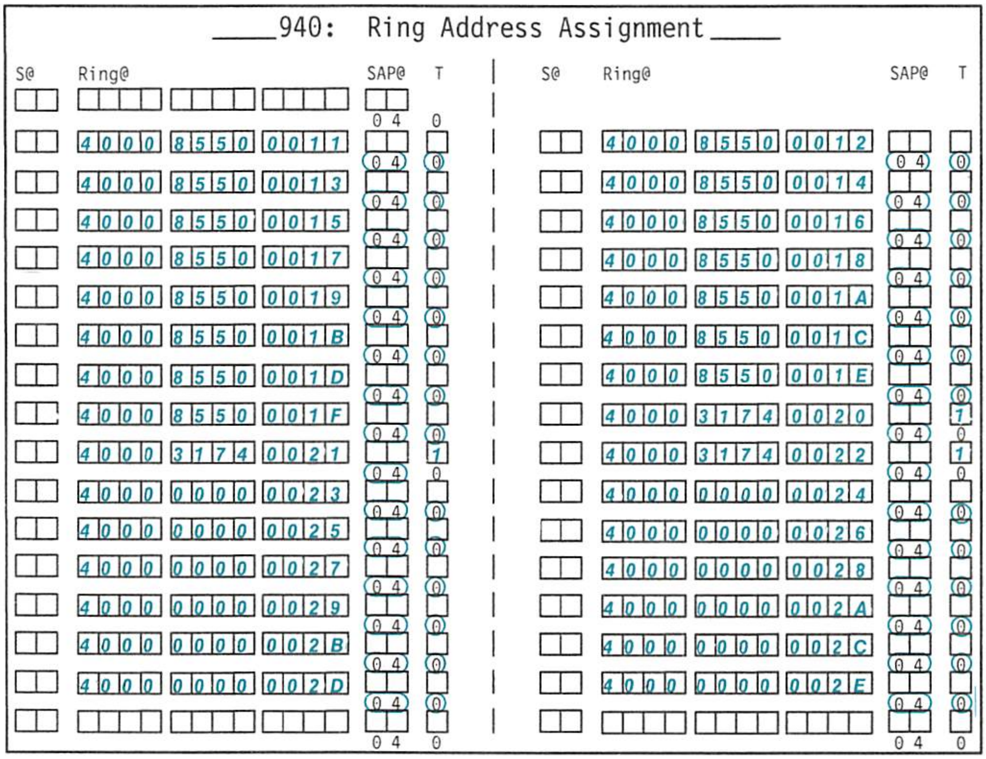
940: Ring Address Assignment Worksheet — Local Gateway

On worksheet 10 (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.
- Circled the defaults for the SAP@ (service access point) columns.
- In the T (type) columns, we circled the default (workstation) for each 8550 personal computer and wrote in a 1 (controller) for each 3174 13R.

Chapter 13 contains additional information pertaining to the columns on this worksheet.



____940: Ring Address Assignment____

S@	Ring@	SAP@	T	S@	Ring@	SAP@	T
		04	0				
	4000 8550 0011	[✓ 04]	[✓ 0]		4000 8550 0012	[✓ 04]	[✓ 0]
	4000 8550 0013	[✓ 04]	[✓ 0]		4000 8550 0014	[✓ 04]	[✓ 0]
	4000 8550 0015	[✓ 04]	[✓ 0]		4000 8550 0016	[✓ 04]	[✓ 0]
	4000 8550 0017	[✓ 04]	[✓ 0]		4000 8550 0018	[✓ 04]	[✓ 0]
	4000 8550 0019	[✓ 04]	[✓ 0]		4000 8550 001A	[✓ 04]	[✓ 0]
	4000 8550 001B	[✓ 04]	[✓ 0]		4000 8550 001C	[✓ 04]	[✓ 0]
	4000 8550 001D	[✓ 04]	[✓ 0]		4000 8550 001E	[✓ 04]	[✓ 0]
	4000 8550 001F	[✓ 04]	[✓ 0]		4000 3174 0020	[✓ 04]	1 (0)
	4000 3174 0021	[✓ 04]	1 (0)		4000 3174 0022	[✓ 04]	1 (0)
	4000 0000 0023	[✓ 04]	[✓ 0]		4000 0000 0024	[✓ 04]	[✓ 0]
	4000 0000 0025	[✓ 04]	[✓ 0]		4000 0000 0026	[✓ 04]	[✓ 0]
	4000 0000 0027	[✓ 04]	[✓ 0]		4000 0000 0028	[✓ 04]	[✓ 0]
	4000 0000 0029	[✓ 04]	[✓ 0]		4000 0000 002A	[✓ 04]	[✓ 0]
	4000 0000 002B	[✓ 04]	[✓ 0]		4000 0000 002C	[✓ 04]	[✓ 0]
	4000 0000 002D	[✓ 04]	[✓ 0]		4000 0000 002E	[✓ 04]	[✓ 0]
		04	0			04	0

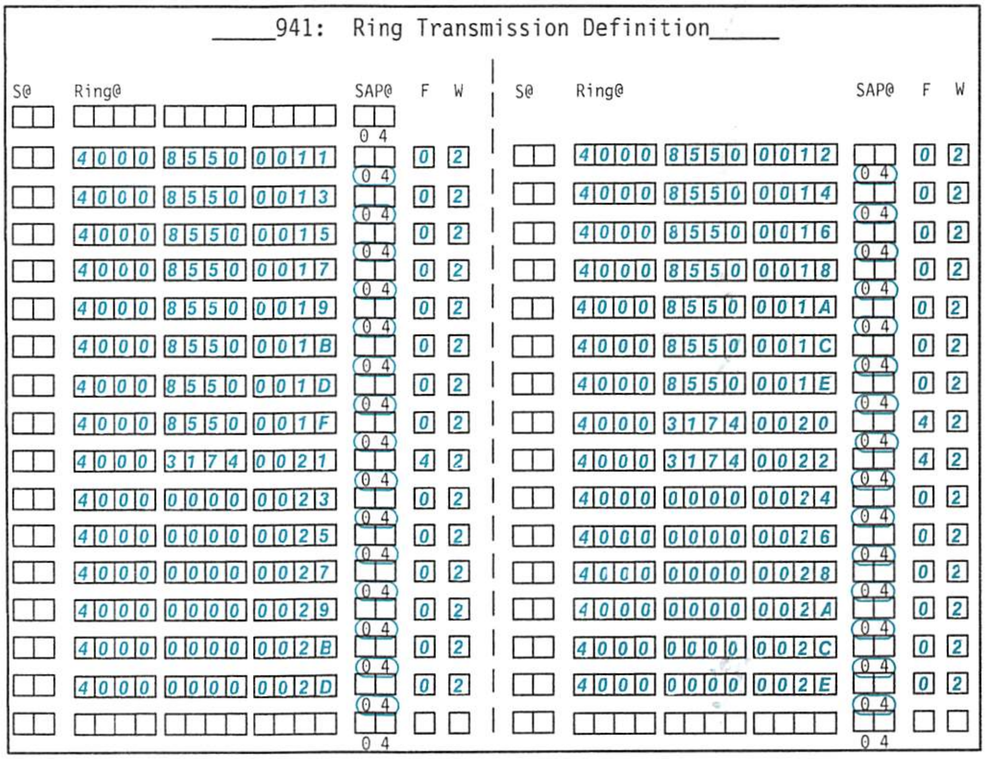
Figure C-5. Worksheet 10 — Local Gateway

941: Ring Transmission Definition Worksheet – Local Gateway

On worksheet 11 (Figure C-6), we have:

- Duplicated our Ring@ entries from the previous worksheet.
- Circled the defaults for the SAP@ (service access point) columns.
- Made entries into the F (transmit I-frame size) columns:
  - For our 8550 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 13 contains additional information pertaining to the columns on this worksheet.



_____941: Ring Transmission Definition_____

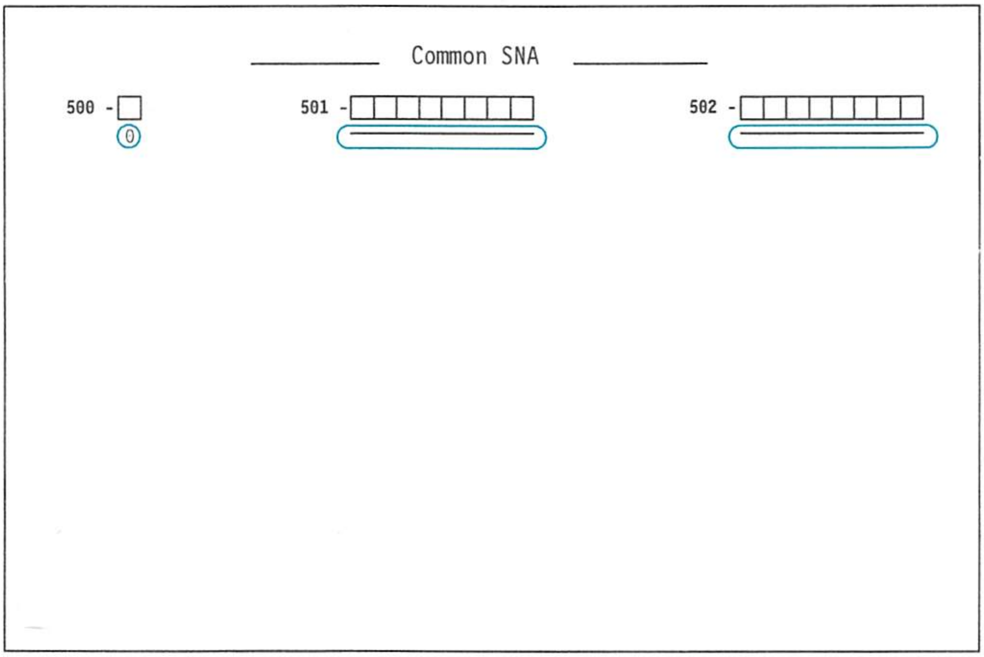
S@	Ring@			SAP@	F	W	S@	Ring@			SAP@	F	W
				04									
	4000	8550	0011	[✓ 04]	0	2		4000	8550	0012	[✓ 04]	0	2
	4000	8550	0013	[✓ 04]	0	2		4000	8550	0014	[✓ 04]	0	2
	4000	8550	0015	[✓ 04]	0	2		4000	8550	0016	[✓ 04]	0	2
	4000	8550	0017	[✓ 04]	0	2		4000	8550	0018	[✓ 04]	0	2
	4000	8550	0019	[✓ 04]	0	2		4000	8550	001A	[✓ 04]	0	2
	4000	8550	001B	[✓ 04]	0	2		4000	8550	001C	[✓ 04]	0	2
	4000	8550	001D	[✓ 04]	0	2		4000	8550	001E	[✓ 04]	0	2
	4000	8550	001F	[✓ 04]	0	2		4000	3174	0020	[✓ 04]	4	2
	4000	3174	0021	[✓ 04]	4	2		4000	3174	0022	[✓ 04]	4	2
	4000	0000	0023	[✓ 04]	0	2		4000	0000	0024	[✓ 04]	0	2
	4000	0000	0025	[✓ 04]	0	2		4000	0000	0026	[✓ 04]	0	2
	4000	0000	0027	[✓ 04]	0	2		4000	0000	0028	[✓ 04]	0	2
	4000	0000	0029	[✓ 04]	0	2		4000	0000	002A	[✓ 04]	0	2
	4000	0000	002B	[✓ 04]	0	2		4000	0000	002C	[✓ 04]	0	2
	4000	0000	002D	[✓ 04]	0	2		4000	0000	002E	[✓ 04]	0	2
				04							04		

Figure C-6. Worksheet 11 – Local Gateway

Common SNA Worksheet — Local Gateway

On worksheet 24 (Figure C-7), we have circled the defaults for configuration questions 500, 501, and 502. Although the Central Site Change Management (CSCM) function 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*, GA23-0342, contains information on CSCM.



Common SNA

500 - ☐ [✓ 0]

501 - ☐☐☐☐☐☐☐☐

502 - ☐☐☐☐☐☐☐☐

Figure C-7. Worksheet 24 — 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 8—Token-Ring Network"
- "Worksheet 24—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

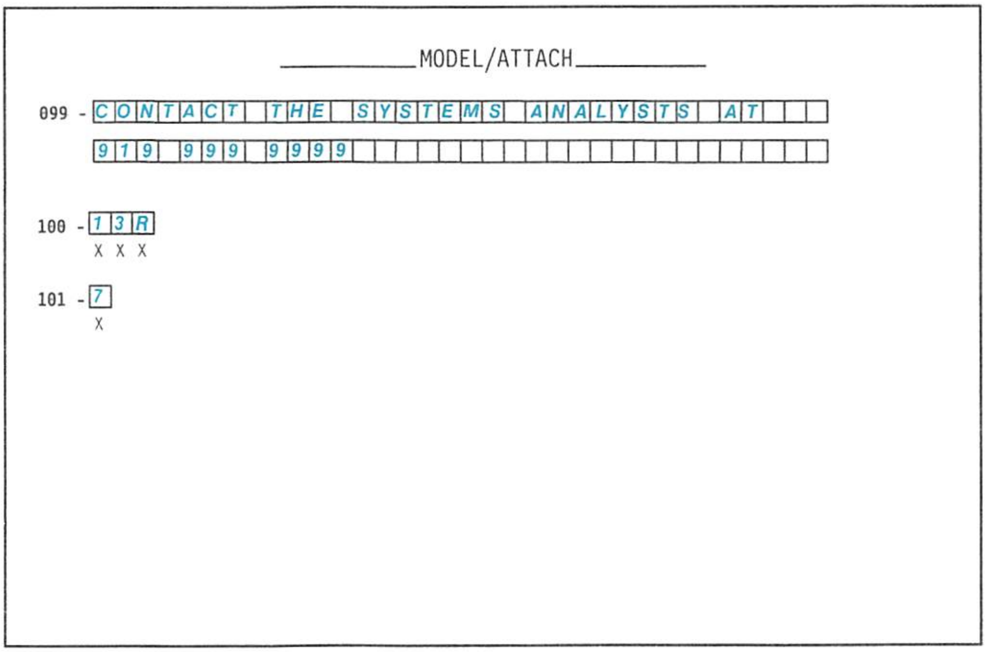
On worksheet 1 (Figure C-8), we have written in responses to the following configuration questions:

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.



MODEL/ATTACH

099 - CONTACT THE SYSTEMS ANALYSTS AT
919 999 9999

100 - 13R
X X X

101 - 7
X

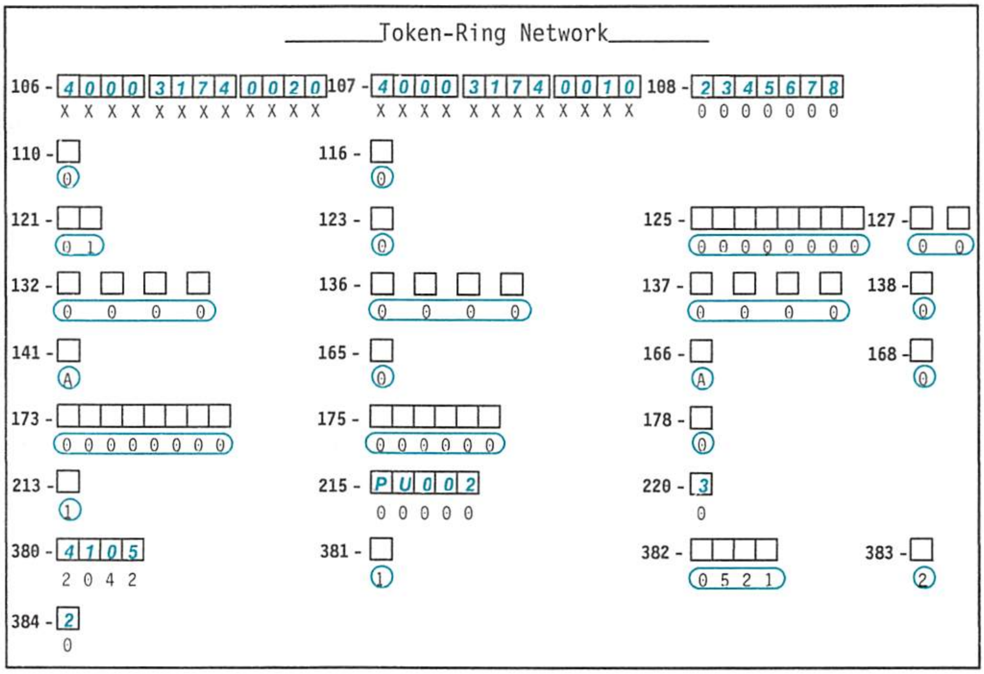
Figure C-8. Worksheet 1 – 3174 Model 13R

Token-Ring Network Worksheet – 3174 Model 13R

On worksheet 8 (Figure C-9), we have written in responses to the following configuration questions:

106 Token-Ring Network address of the 3174. The locally administered address **4000 3174 0020** was assigned to this controller.
107 Token-Ring Network address of the gateway. We have written in the gateway's address, **4000 3174 0010**.
108 Unique machine identifier. We have written in this controller's serial number **2345678** as the identifier.
215 Physical unit identification. We have specified **PU002** as the host's identifier for this controller.
220 Alert function. A response of **3** has been given, allowing operators to send alert messages from all ports.
380 Maximum receive I-frame size. We indicated that **4105** bytes is the maximum I-frame size that can be received.
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.



Token-Ring Network

106 - 4000 3174 0020
X X X X X X X X X X X X
107 - 4000 3174 0010
X X X X X X X X X X X X
108 - 2345678
0 0 0 0 0 0 0

110 - ☐
0
116 - ☐
0

121 - ☐☐
0 1
123 - ☐
0
125 - ☐☐☐☐☐☐☐☐
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
178 - ☐
0

213 - ☐
1
215 - PU002
0 0 0 0 0
220 - 3
0

380 - 4105
2 0 4 2
381 - ☐
1
382 - ☐☐☐☐
0 5 2 1
383 - ☐
2

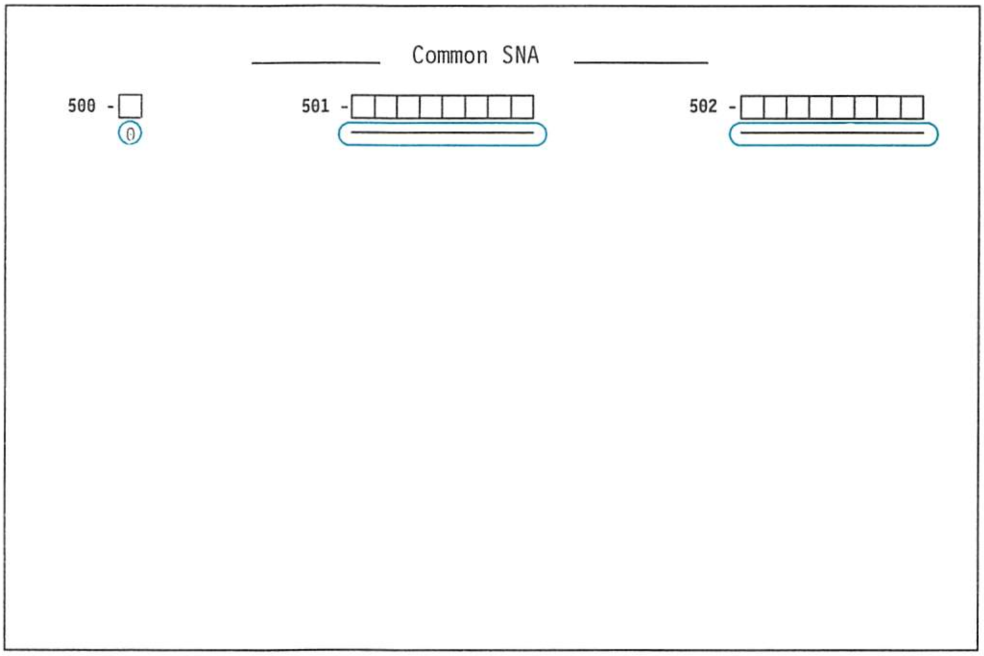
384 - 2
0

Figure C-9. Worksheet 8 – 3174 Model 13R

Common SNA Worksheet — 3174 Model 13R

On worksheet 24 (Figure C-10), we have circled the defaults for questions 500, 501, and 502. Although the Central Site Change Management (CSCM) function 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*, GA23-0342, contains information on CSCM.



Common SNA

500 - ☐ [✓ 0]

501 - ☐☐☐☐☐☐☐☐

502 - ☐☐☐☐☐☐☐☐

Figure C-10. Worksheet 24 — 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.

In Figure C-11 on page C-16, we have a typical network of the branch offices. 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 8560 personal computers attached to the backbone ring.

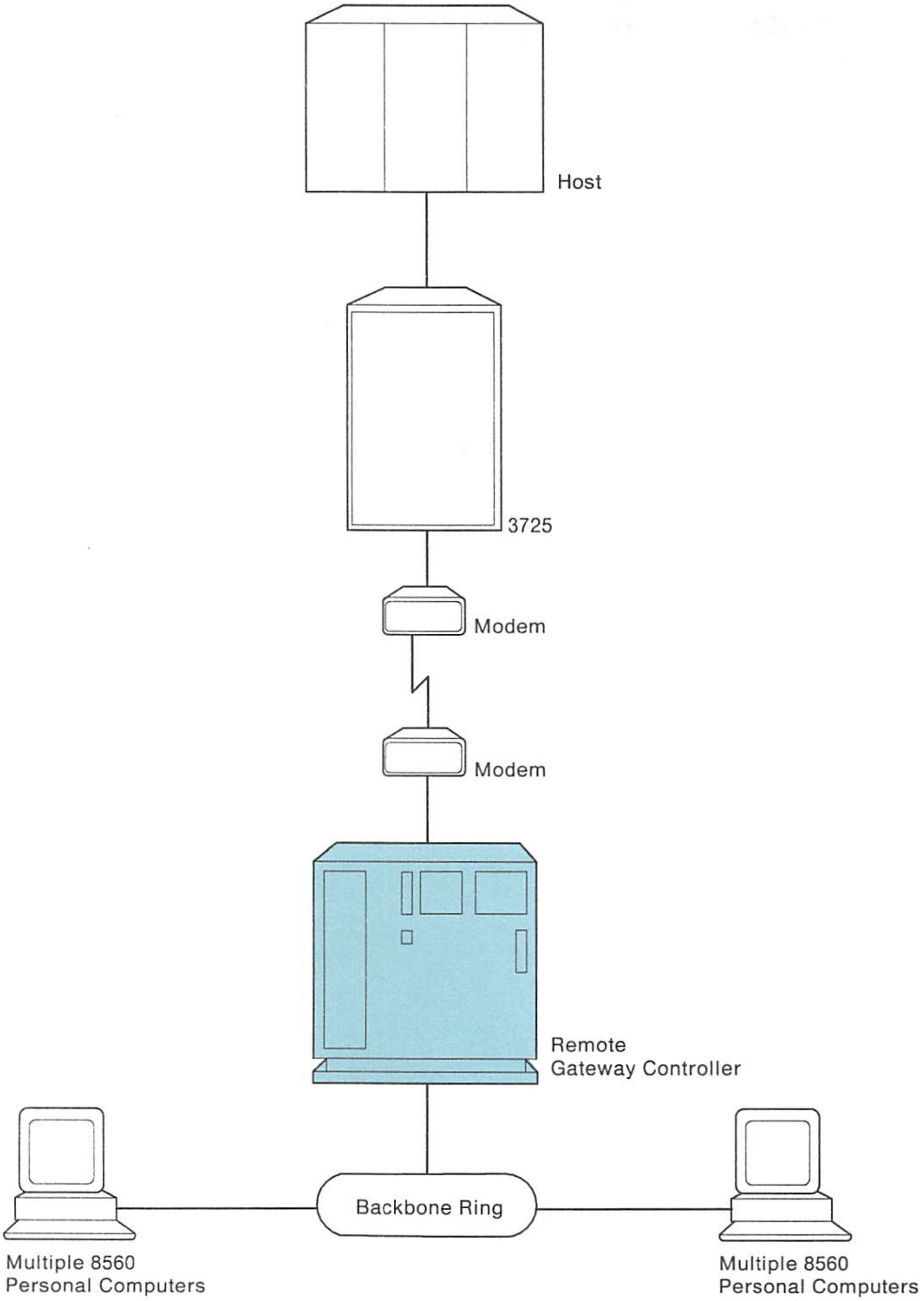


Figure C-11. Token-Ring Network – Remote Gateway

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 9—Token-Ring Gateway"
- "Worksheet 10—Ring Address Assignment"
- "Worksheet 11—Ring Transmission Definition"
- "Worksheet 24—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.

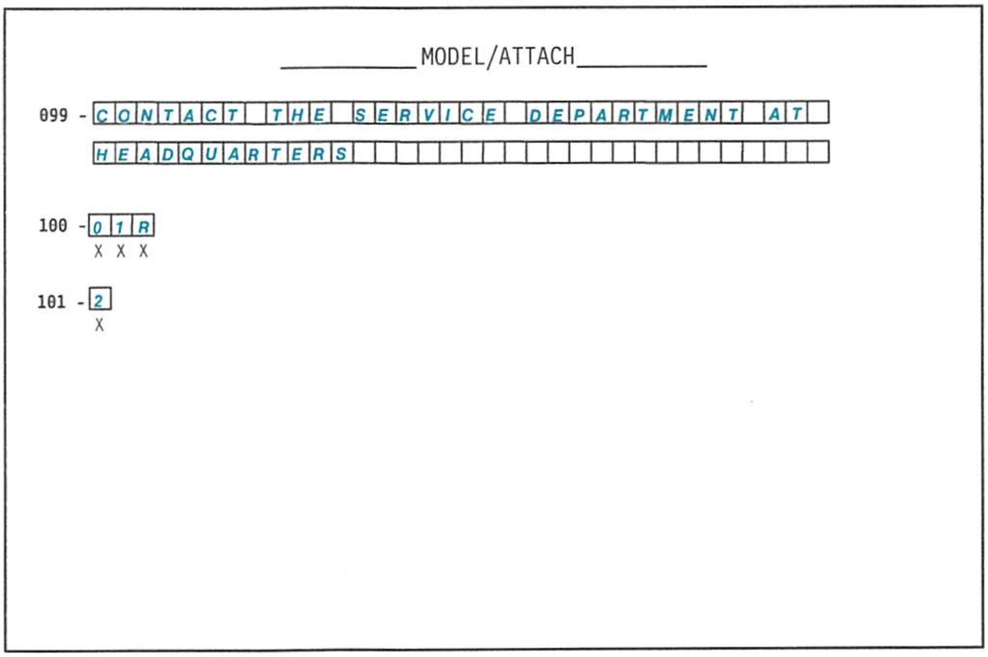
Note: Most defaults were chosen to simplify the examples; they do not imply a recommendation.

Host Attachment Worksheet – Remote Gateway

On worksheet 1 (Figure C-12), we have written in responses to the following configuration questions:

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

099 - CONTACT THE SERVICE DEPARTMENT AT
HEADQUARTERS

100 - 01R
XXX

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 I/O address X'**01**' to the gateway.

105 Upper limit address. We specified X'**14**' 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 20 addresses, allowing for future expansion.

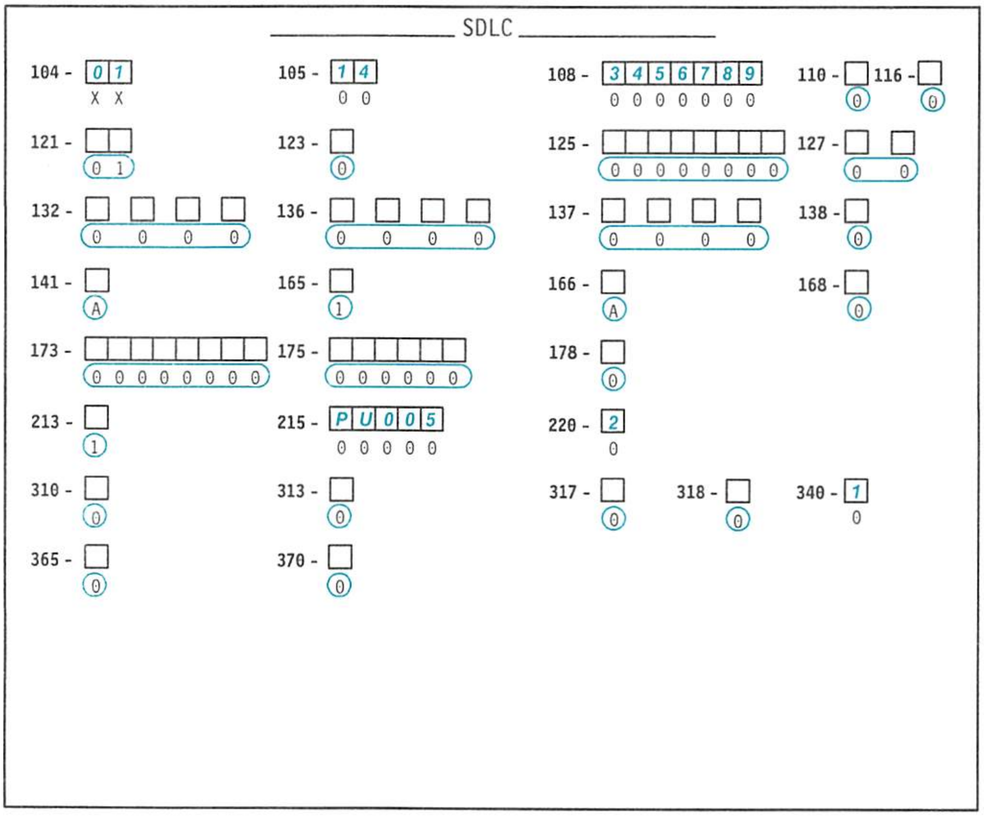
108 Unique machine identifier. We have written in the gateway's serial number **3456789** as the identifier.

215 Physical unit identification. We have specified **PU005** as the host's identifier for our gateway.

220 Alert 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.



SDLC

104 -	0 1	X X
105 -	1 4	0 0
108 -	3 4 5 6 7 8 9	0 0 0 0 0 0 0
110 -	☐	[✓ 0]
116 -	☐	[✓ 0]
121 -	☐☐	[✓ 0 1]
123 -	☐	[✓ 0]
125 -	☐☐☐☐☐☐☐☐	[✓ 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]
178 -	☐	[✓ 0]
213 -	☐	[✓ 1]
215 -	P U 0 0 5	0 0 0 0 0
220 -	2	0
310 -	☐	[✓ 0]
313 -	☐	[✓ 0]
317 -	☐	[✓ 0]
318 -	☐	[✓ 0]
340 -	1	0
365 -	☐	[✓ 0]
370 -	☐	[✓ 0]

Figure C-13. Worksheet 4 – Remote Gateway

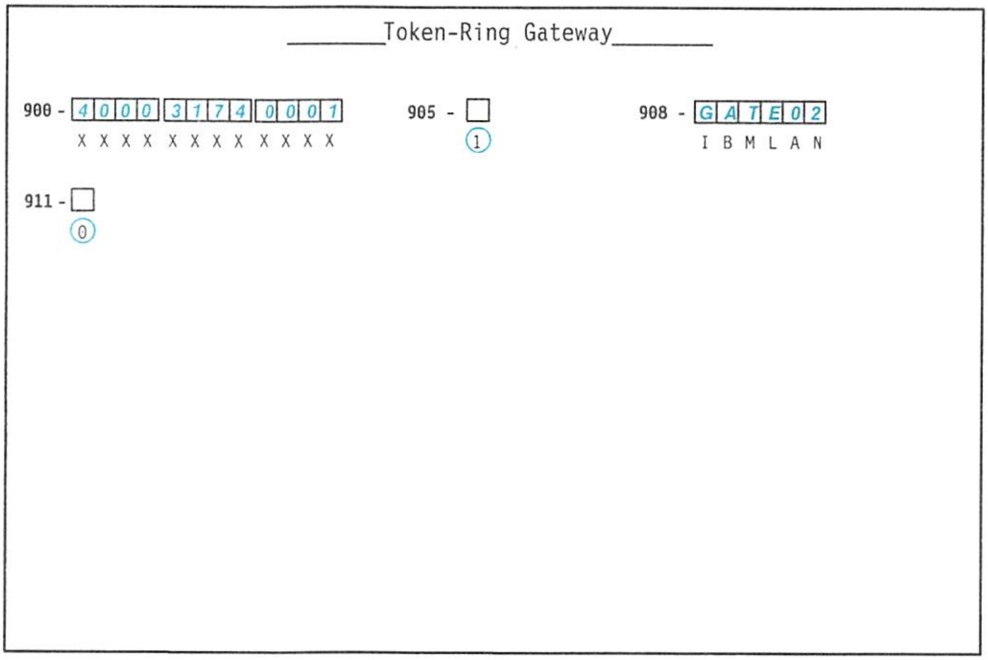
Token-Ring Gateway Worksheet – Remote Gateway

On worksheet 9 (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.

908 Link subsystem name. We have written in **GATE02**. The host will use this name to identify any alerts sent from this gateway.

Chapter 13 contains additional information on the configuration questions that appear on this worksheet.



Token-Ring Gateway

900 - 4000 3174 0001
X X X X X X X X X X X X

905 - ☐
①

908 - GATE02
I B M L A N

911 - ☐
⓪

Figure C-14. Worksheet 9 – Remote Gateway

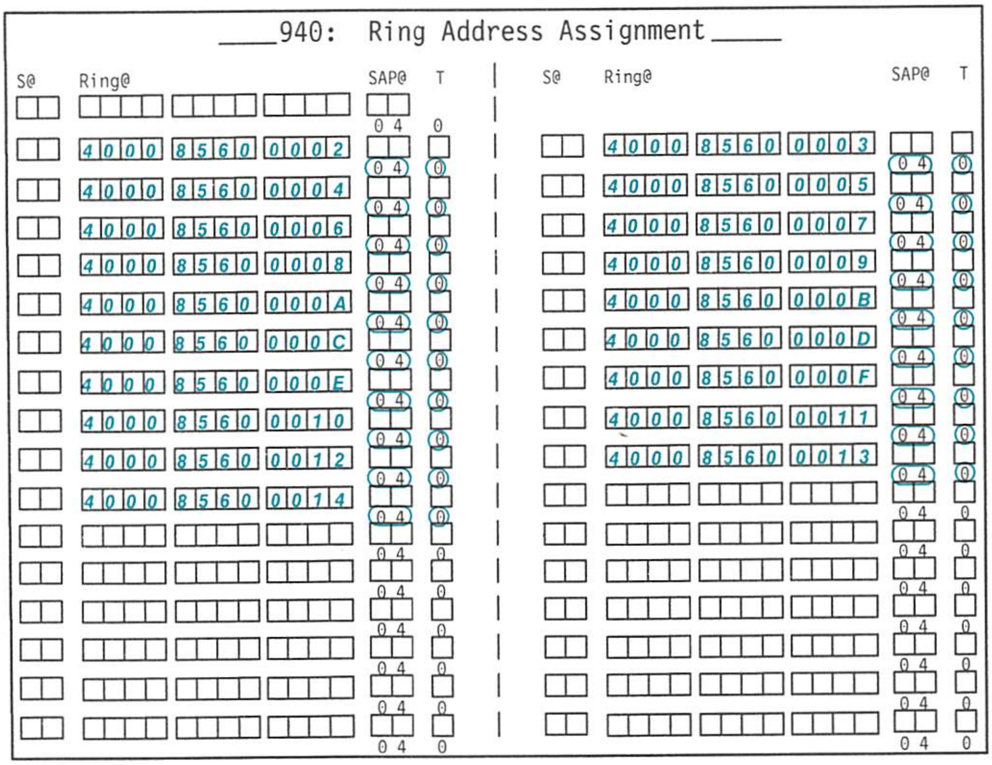
940: Ring Address Assignment Worksheet – Remote Gateway

On worksheet 10 (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 8560 personal computer.

Chapter 13 contains additional information pertaining to the columns on this worksheet.



940: Ring Address Assignment

S@	Ring@	SAP@	T	S@	Ring@	SAP@	T
		04	0				
	4000 8560 0002	[✓ 04]	[✓ 0]		4000 8560 0003	[✓ 04]	[✓ 0]
	4000 8560 0004	[✓ 04]	[✓ 0]		4000 8560 0005	[✓ 04]	[✓ 0]
	4000 8560 0006	[✓ 04]	[✓ 0]		4000 8560 0007	[✓ 04]	[✓ 0]
	4000 8560 0008	[✓ 04]	[✓ 0]		4000 8560 0009	[✓ 04]	[✓ 0]
	4000 8560 000A	[✓ 04]	[✓ 0]		4000 8560 000B	[✓ 04]	[✓ 0]
	4000 8560 000C	[✓ 04]	[✓ 0]		4000 8560 000D	[✓ 04]	[✓ 0]
	4000 8560 000E	[✓ 04]	[✓ 0]		4000 8560 000F	[✓ 04]	[✓ 0]
	4000 8560 0010	[✓ 04]	[✓ 0]		4000 8560 0011	[✓ 04]	[✓ 0]
	4000 8560 0012	[✓ 04]	[✓ 0]		4000 8560 0013	[✓ 04]	[✓ 0]
	4000 8560 0014	[✓ 04]	[✓ 0]			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0
		04	0			04	0

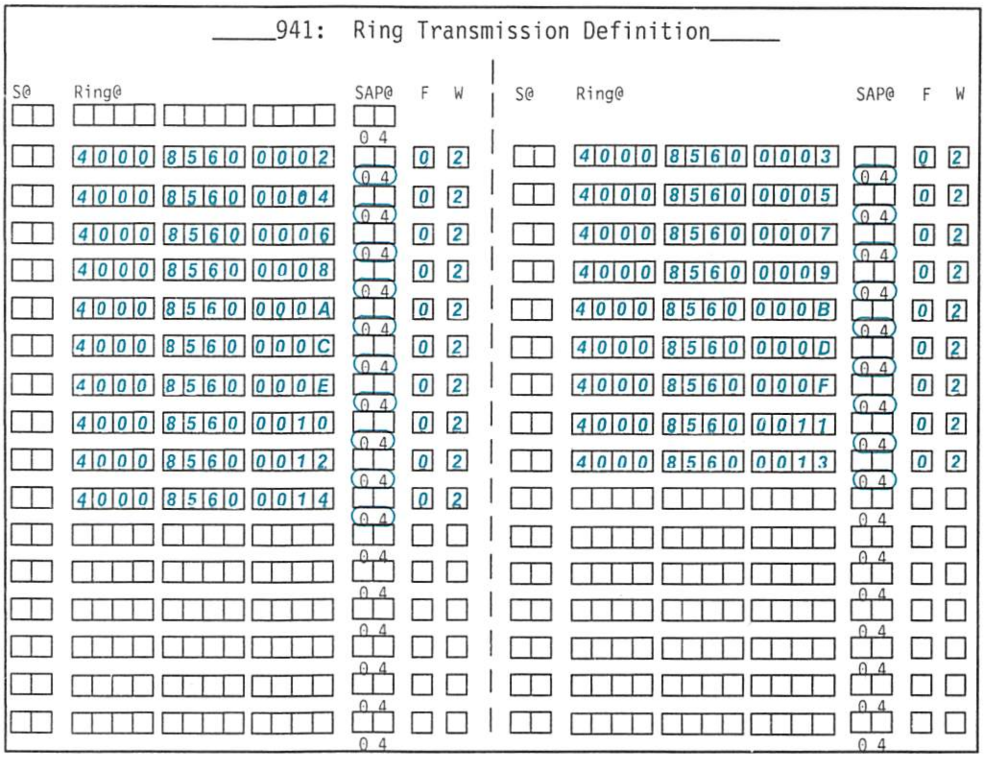
Figure C-15. Worksheet 10 – Remote Gateway

941: Ring Transmission Definition Worksheet – Remote Gateway

On worksheet 11 (Figure C-16), we have:

- Duplicated our Ring@ entries from the previous worksheet.
- Circled the defaults for the SAP@ (service access point) columns.
- Written **0**s (the default for workstations) into the F (transmit I-frame size) columns to indicate 265-byte I-frame transmissions.
- Written **2**s (the default for workstations) into the W (maximum-out) columns to indicate the maximum number of transmissions allowed before and an acknowledgment.

Chapter 13 contains additional information pertaining to the columns on this worksheet.



_____941: Ring Transmission Definition_____

S@	Ring@	SAP@	F	W	S@	Ring@	SAP@	F	W
		0 4							
	4000 8560 0002	0 4	0	2		4000 8560 0003	0 4	0	2
	4000 8560 0004	0 4	0	2		4000 8560 0005	0 4	0	2
	4000 8560 0006	0 4	0	2		4000 8560 0007	0 4	0	2
	4000 8560 0008	0 4	0	2		4000 8560 0009	0 4	0	2
	4000 8560 000A	0 4	0	2		4000 8560 000B	0 4	0	2
	4000 8560 000C	0 4	0	2		4000 8560 000D	0 4	0	2
	4000 8560 000E	0 4	0	2		4000 8560 000F	0 4	0	2
	4000 8560 0010	0 4	0	2		4000 8560 0011	0 4	0	2
	4000 8560 0012	0 4	0	2		4000 8560 0013	0 4	0	2
	4000 8560 0014	0 4	0	2			0 4		
		0 4					0 4		
		0 4					0 4		
		0 4					0 4		
		0 4					0 4		
		0 4					0 4		
		0 4					0 4		

Figure C-16. Worksheet 11 – Remote Gateway

Common SNA Worksheet – Remote Gateway

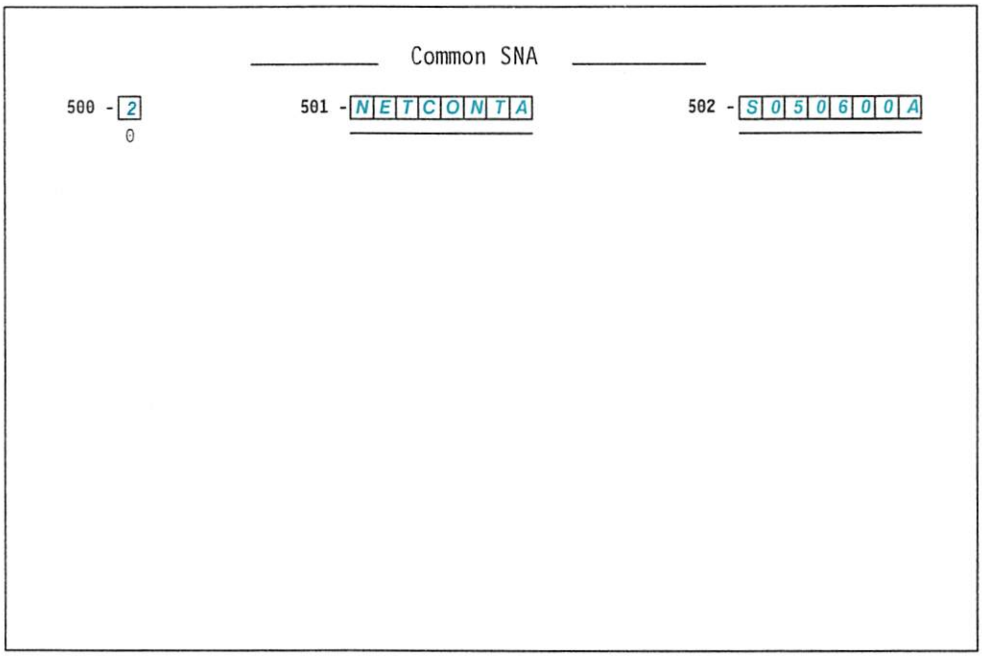
On worksheet 24 (Figure C-17), we have written in responses to the following configuration questions:

500 CSCM unique. A response of **2** 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** (a library member name) 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*, GA23-0342, contains information on CSCM.



Common SNA

500 - 2
0

501 - NETCONTA

502 - S050600A

Figure C-17. Worksheet 24 – Remote Gateway

Appendix D. Examples of 3174 VTAM/NCP Definitions

This appendix contains VTAM and NCP definition examples for devices attached to a SDLC link, to an X.25 connection, to the Token-Ring Network, and examples for local channel-attached SNA-3270 and non-SNA-3270 devices.

Local 3174 Definitions (SNA)

PU DEFINITION

```
                         LOCAL 3174 DEFINITIONS
LOCCOLOR VBUILD   TYPE=LOCAL
LOCAPU   PU     CUADDR=5E,ISTATUS=ACTIVE,PUTYPE=2,MAXBFRU=10,            *
                MODETAB=MT327X
```

LU DEFINITION

```
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.

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

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
               STATOPT='3174 LINE'
```

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 PU3174

CBS3174   (definition model)

```
              SERVICE MACRO SPECIFICATION FOR SDLC (LINE 000)
P13000A  PU    ADDR=C1,              CLUSTER ADDRESS = C1                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,        RECOMMENDED LOGMODE TITLE ENTRY     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
*
```

```
T1300008 LU    LOCADDR=08          3270PC                              X
               MODETAB=MTPSPC,                                         X
               DLOGMOD=PCMODE,                                         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,      DEPENDANT 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=X25INO1,  STAGE 2 OUTPUT MEMBER NAME (1 = GENNO)  C
                ORDHI=X25HJO1,    STAGE 2 OUTPUT MEMBER NAME (1 = GENNO)  C
                ORDL2HI=X25HIO1,  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

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
               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

NCP definitions for a 3720 - 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    ...
```

List of Abbreviations

A

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.

APL. A Programming Language.

ASCII. American National Standard Code for Information Interchange.

ATTN. Attention.

B

bps. Bits per second.

BSC. Binary synchronous communication.

C

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.

CID. Connection identifier.

CMS. Conversational monitor system.

cncl. Cancel.

CNM. Communication network management.

coax. Coaxial (cable).

comm. Communication.

CR. (1) Command Reject. (2) Carriage return.

CSCM. Central Site Change Management.

CTS. Clear to Send.

CU. Control unit.

CUE. Control Unit End.

CUG. Closed user group.

CUT. Control unit terminal.

D

DCE. Data-circuit-terminating equipment.

DE. Device-end.

DEL. The delete character.

DFT. Distributed function terminal.

DISC. Disconnect.

DM. (1) Disconnect mode. (2) Distribution Manager.

DOS. Disk Operating System.

DPKT. Default packet size.

DSL. Downstream load.

DSR. Data set ready.

DTE. Data terminal equipment.

DTR. Data terminal ready.

dup, DUP. Duplicate.

DWND. Default window size.

E

EAB. Extended Attribute Buffer.

EAU. Erase All Unprotected.

EB. End bracket.

EBCDIC. Extended binary-coded decimal interchange code.

EIA. Electronic Industries Association.

EOT. End-of-transmission character.

ETX. End of Text.

E/W. Erase/Write.

F

FCC. Federal Communications Commission.

FF. Forms feed.

FM. (1) Frequency modulation. (2) Function management. (3) Field mark.

FMH. Function management header.

FRU. Field-replaceable unit.

H

HDLC. High-level data link control.

hex. Hexadecimal.

HNAD. Host network (DTE) address.

I

ID. Identification, identifier.

Ident. Identification.

IML. Initial microcode load.

INS. Insert.

I/O. Input/output.

IPDS. Intelligent Printer Data Stream.

IR. Intervention Required.

K

k. 1000.

K. 1024.

KB. Kilobyte; 1024 bytes.

L

LAN. Local area network.

LAPB. Link access procedure balanced.

LFU. Limited Function Utility.

LIB. Library.

LIC. Last in chain.

LLC. Logical link control.

LT. Logical terminal.

LU. Logical unit.

M

MAP. Maintenance analysis procedure.

max. Maximum.

min. Minimum, minute.

MIS. Multiple interactive sessions.

MLT. Multiple logical terminals.

modem. Modulator-demodulator.

MVS. Multiple virtual storage.

N

NCP. Network Control Program.

NPKT. Negotiated packet size.

NRZ. Nonreturn to zero.

NRZI. Nonreturn to zero inverted.

NUM. Numeric.

NWND. Negotiated window size.

O

OEM. Original equipment manufacturer.

P

PA. (1) Program access. (2) Program attention.

PAM. Printer authorization matrix.

PC. Personal Computer.

PF. Program function.

PID. Product-set ID.

PIU. Path information unit.

PLU. Primary logical unit.

PS. Programmed symbols.

PSH. Physical services header.

PSS. Programmed symbol set.

PU. Physical unit

PUID. Physical unit identification.

PVC. Permanent virtual circuit.

Q

QLLC. Qualified logical link control.

R

RECFMS. Record Formatted Maintenance Statistics.

Req. Request.

REQMS. Request Maintenance Statistics.

resp. Response.

RH. Request/response header.

ROS. Read-only storage.

RPOA. Recognized private operating agency.

RPQ. Request for price quotation.

RTM. Response Time Monitor.

RTS. Request to send.

RU. Request/response unit.

S

SAP. Service access point.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

SM. Status modifier.

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.

TH. Transmission header.

TMA. Terminal multiplexer adapter.

TP. Teleprocessing.

U

UC. Unit check.

UCW. Unit control word.

UE. Unit exception.

UKPSS. United Kingdom Packet Switched Service.

U.S. United States.

US. Unit separator.

V

VSE. Virtual storage extended.

VTAM. Virtual Telecommunications Access Method.

W

WACK. Wait before transmit.

WCC. Write control character.

WE. Western Electric.

WSF. Write Structured Field.

Glossary

This glossary includes terms and definitions from the *IBM Dictionary of Computing: Information Processing, Personal Computing, Telecommunications, Office Systems, IBM-specific Terms*, SC20-1699.

The terms in this glossary are defined here as they apply to the 3270 Information Display System.

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. Able to communicate on the network. An adapter is active if it is able to pass tokens on the network.

active logical terminal (LT). In MLT, the currently displayed logical terminal. Synonymous with *foreground logical terminal*. Contrast with *background logical terminal*.

adapter. A general term for a device that provides some transitional function between two or more devices.

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 work station connected to a network.

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. (1) In the IBM Token-Ring Network Manager, a notification appearing on the bottom line of any panel to indicate an interruption or a potential interruption in the flow of data around the ring. (2) In NetView, a notification about a high-priority event that warrants immediate attention. This data-base record is generated for certain event types that are defined by user-constructed filters.

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 action of loading the Utility microcode.

American National Standard Code for Information Interchange (ASCII). A 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 graphic characters.

application. The use to which an information processing system is put, for example, a payroll application, an airline reservation application, or a network application.

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

ASCII emulation. The ability of a 3270 display station or printer to communicate with an ASCII host using the DEC VT100 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) Without regular time relationship; unexpected or unpredictable with respect to the execution of program instructions. (2) In asynchronous data transmissions, data characters may be sent or received at any time; no modem clocking is used to establish bit timing.

Asynchronous Emulation Adapter (AEA). In the 3174 Establishment Controller, 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 the DEC VT100 data stream or the IBM 3101 data stream.

attach. To connect a device logically to a 3174 adapter, so that it can communicate over the network.

attaching device. Any device that is physically connected to a network and can communicate over the network.

attachment feature. The circuitry by which a cable from a local terminal or a modem for a remote terminal is attached to a 3792 Auxiliary Control Unit or a 3791 Controller.

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.

attribute select keyboard. A keyboard that enables the operator, when permitted by the program, to change the character attributes of the keyed-in character.

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.

auto-call. See *automatic calling.*

automatic answering. (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. (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) Synonymous with auto-call. See also *manual calling.* Contrast with *automatic answering.*

auto removal. Removing a device from the data-passing activity without human intervention. This action is accomplished by the adapter.

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).*

Base data set. A data set that does not include CECP-unique graphics.

binary synchronous communications (BSC). Data transmission in which character synchronism is controlled by timing signals generated at the sending and receiving stations.

blink. An extended highlighting attribute value (for emphasis) of a field or character.

bracket. In SNA, one or more chains of request units (RUs) and their responses, which are exchanged between two LU-LU half-sessions and 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 work stations.

bridge. (1) A functional unit that connects two local area networks (LANs) that use the same logical link control (LLC) procedure but may use different medium access control (MAC) procedures. (2) See also *backbone* and *gateway*.

Note: A bridge connects networks or systems of the same or similar architectures, whereas a gateway connects networks or systems of different architectures.

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (2) An isolating circuit used to prevent a driven circuit from influencing the driving circuit. (3) To allocate and schedule the use of buffers. (4) A portion of storage used to hold input or output temporarily.

burst. (1) In data communication, a sequence of signals counted as one unit in accordance with some specific criterion or measure. (2) To separate continuous-form paper into discrete sheets.

bus. A type of network topology where the network consists of a bidirectional communication path with defined end points.

C

card. In the 3174 Establishment Controller, a unit of electronic circuitry contained in a plastic casing (or cassette) and providing the control unit with a specialized function, for example, a Terminal Adapter or an Encrypt/Decrypt Adapter.

CECP-capable device. A data set that does not contain CECP-unique graphics.

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 symbol that is in the CECP character set and not in the Base support.

Central site change management (CSCM). A function of the 3174 microcode that tracks the microcode for each control unit in a network and, in conjunction with NetView DM, electronically distributes and retrieves microcode changes for each control unit.

central site customizing. The process of tailoring control unit microcode for each control unit in a network, at the central site.

central site library. One or more Library disks that contain customizing data and label information for the control units in a network.

channel-attached. Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. Synonym for *local*. Contrast with *telecommunication-attached.*

channel command. An instruction that directs a data channel, control unit, or device to perform an operation or set of operations.

channel-to-channel adapter. A hardware device that can be used to connect two channels on the same computing system or on different systems.

character mode. A mode in which input is treated as alphanumeric data, rather than graphic data.

character position. A location on the screen at which 1 character can be displayed; also, 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.

Clear to Send (CTS) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the CTS lead on an EIA 232D interface.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

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 3601 Finance Communication 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*.

cluster control unit. Synonym for cluster controller.

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. An instruction that directs a control unit or device to perform an operation or a set of operations.

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 control unit. A communication device that controls transmission of data over lines in a network.

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.

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*.

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.*

Connection Menu. A menu on the screen of a display station attached to the 3174 Establishment Controller, from which a user can select an available host.

connector. A means of establishing electrical flow.

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 control unit's attached terminals, and its method of attachment to the host.

Control (CTL) diskette. A customized diskette containing the microcode that describes a particular control unit's attached terminals, and its method of attachment to the host.

control function. Synonym for *control operation.*

controller. A unit that controls input/output operations for one or more devices.

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 unit. A general term for any device that provides common functions for other devices or mechanisms. The 3174 is an example of a control unit.

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.

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 control unit.

country extended code page (CECP). A function of the 3174 microcode that provides for 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.

create. In 3174 central site customizing, to create a library member for a network control unit, 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.

customization. Procedures that tailor the control unit microcode to fit the various types of display stations and printers and the method of host attachment that a particular control unit 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 control unit. 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 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.

Notes:

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.
2. A DCE may perform other functions that are usually performed at the network end of the line.

Data Entry keyboard. A keyboard layout designed for data entry applications.

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. Any physical link, such as a wire or a telephone circuit, that connects one or more devices or communication controllers.

data processing (DP). The systematic performance of operations upon data; for example, handling, merging, sorting, computing.

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 terminal equipment (DTE). That part of a data station that serves as a data source, data sink, 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. The movement, or copying, of data from one location and the storage of the data at another location.

decrypt. To convert encrypted data into clear data. Contrast with *encrypt*.

default destination. A destination for display stations and printers that is defined in customization.

default response. A response supplied by the customizing program 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. A mechanical, electrical, or electronic contrivance with a specific purpose.

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 frame. (1) In computer graphics, an area in storage in which a display image can be recorded. (2) In computer micrographics, an area on a microform in which a display image can be recorded.

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 diskette containing the terminal's control program is loaded into the control unit.

drop. In the IBM Cabling System, a cable that runs from a faceplate to the distribution panel in a wiring closet.

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full duplex*.

E

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. (1) 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*.

encrypt. To scramble data or convert it, before transmission, to a secret code that masks the meaning of the data to any unauthorized recipient. Contrast with *decrypt*.

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.

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.

extended attribute buffer (EAB). The buffer in which the extended field attribute for the 3270 Kanji display field is stored.

extended binary-coded decimal interchange code (EBCDIC). A coded character set of 256 eight-bit 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 domain. In IBM Token-Ring Network problem determination, the portion of a ring that is involved with an indicated error.

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.

foreground logical terminal (LT). Synonym for *active logical terminal (LT)*.

frame. (1) The portion of a tape, on a line perpendicular to the reference edge, on which binary characters can be written or read simultaneously. (2) A housing for machine elements. (3) The hardware support structure, covers, and all electrical parts mounted therein that are packaged as one entity for shipping. (4) A formatted display. See *display frame*.

full duplex. Synonym for *duplex*.

G

gateway. (1) A functional unit that connects two computer networks of different network architectures.

Note: A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures.

generate. In 3174 central site customizing, to write a Control diskette containing the customizing data for a particular control unit. Also, to print a mailing address label and a diskette label for a particular control unit.

get. In 3174 central site customizing, to select the type of data you want and store it in working copy.

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.

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 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 work stations connected to it.

I

initial microcode load (IML). The action of loading the operational microcode.

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.

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.

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.

keyboard graphic layer. A logical division of a keyboard, containing a set of characters that logically belong together, such as those representing a national layout or language.

L

layer. One of the seven layers of the Open Systems Interconnection reference model.

leased line. Synonym for *nonswitched line*.

library member. A file located on a Library disk that contains customizing information for a control unit in a network.

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, and Identify Customizing Keyboard. 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. The logical connection between nodes including the end-to-end link control procedures.

link station. (1) A specific place in a service access point 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.

lobe. In the IBM Token-Ring Network, the section of cable that attaches a device to an access unit. The cable may consist of several segments.

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 data network located on the user's premises in which serial transmission is used for direct data communication among data stations.

Notes:

1. Communication within a local area network is not subject to external regulation; however, communication across the LAN boundary may be subject to some form of regulation.
2. A LAN does not use store and forward techniques.

location. With reference to a 3174, a place within the 3174 chassis where a particular card or adapter is inserted.

logical terminal (LT). In MLT, one of five sessions available to share one display station.

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.

M

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).

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 energy.

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.

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.

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.

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.

N

native mode. A 3179 or 3180 operational mode that uses the full capabilities of those models' display and keyboard.

NetView. A comprehensive network management product that is the basis for central control of both systems for network operations. It supersedes NCCF, NPDA, NLDM, and NPM.

network. (1) An arrangement of nodes and connecting branches. Connections are made between data stations. (2) A configuration of data processing devices and software connected for information interchange.

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).

node. An end point of a link or a junction common to two or more links in a network.

nonescaping key. A key that allows a character to be typed without the imprint position being changed.

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.

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 fiber. A single, separate optical transmission element comprising a core and a cladding.

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.

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*.

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.

path. In a network, a route between any two nodes.

physical unit (PU). In SNA, the component that manages and monitors the resources (such as attached links and adjacent link stations) of a node, as requested by an SSCP through an SSCP-SSCP session.

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 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 control unit 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 symbol set (PSS). A set of fonts that can be system-defined or defined by the user and to which a code can be assigned.

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.

protocol. (1) A set of semantic and syntactic rules that determine 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.

put. In 3174 central site customizing, to store data from the working copy into a library member.

R

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line.

request for price quotation (RPQ). An alteration or addition to the functional capabilities that the control unit provides.

response field. On a display device, a specified area on the display space where the user can enter, modify, or erase response data.

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 interface adapter. A device that assumes the basic data transmission functions of node, such as frame recognition, address decoding, error checking, buffering of frames, fault detection, and, in Token-Ring Networks, token generation.

ring network. A network configuration where a series of attaching devices are connected by unidirectional transmission links to form a closed path.

ring status. The condition of the ring.

S

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.*

service access point. 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.

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. In 3174, the total number of logical terminals or defined AEA default destinations for an AEA port set.

simulate. (1) To represent certain features of the behavior of a physical or abstract system by the behavior of another system; for example, to represent a physical phenomenon by means of operations performed by a computer or to represent the operations of a computer by those of another computer. (2) To imitate one system with another, primarily by software, so that the imitating system accepts the same data, executes the same computer programs, and achieves the same results as the imitated system. (3) Contrast with *emulate.*

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.*

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.

staging adapter. (1) An addition to a System/370 Model 158 or 168 Integrated Storage Control (ISC) feature that enables the integrated storage control to operate in a 3850 Mass Storage System. (2) An IBM 3850 Model 3 Storage Control, which is a 3830 Model 2 Storage Control that has been modified to operate in a 3850 Mass Storage System.

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.

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.

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 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 and logical units 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 control unit.*

terminal. In data communication, a display station or printer capable of sending or receiving information.

terminal adapter (TA). An adapter that provides control for a maximum of 32 terminals; each BNC connector (four in all) on the terminal adapter can control either one terminal that is directly attached or as many as eight terminals that are attached through a terminal multiplexer adapter (located in the 3174) or a 3299 Terminal Multiplexer (located outside 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 coaxial 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 type menu. A list of all the available names and terminal types for a given port.

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.

token. In a local area network, the symbol of authority passed among data stations to indicate the station temporarily in control of the transmission medium.

Note: A token is a particular message or bit pattern that signifies permission to transmit.

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 the transmitting station. (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

transmission control 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*.

transmitter. See *universal receiver-transmitter*.

type. In the 3174 Establishment Controller, the identifying number of a card. For example, 9150 is the 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.

U

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.

update. In 3174 central site customizing, to tailor a library member's customizing data, in working copy, and put it back to the library diskette.

upgrade. In 3174 central site customizing, to select a library member and upgrade its data to the microcode level of the Central Site Customizing Procedure diskette.

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.

viewport. In the 3270 Information Display System, an area on the usable area of the display surface through which an operator views all or a portion of the data outlined by the window on the presentation plane.

W

wire fault. An error condition caused by a break in the wires or a short between the wires (or shield) in a segment of cable.

workstation. An input/output device that allows transmission of data or reception of data as needed to perform a job.

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

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.

Index

IBM 3174 Establishment Controller
Planning Guide
Configuration Support A and S
Release 5

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Inserting the Divider Pages

Use the following steps to insert the divider pages into the *3174 Planning Guide*.

Step 1 Check the contents of this package. It should contain four divider pages with tabs:

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

Step 2 Insert the divider page labeled "Microcode Customization Planning" in front of "Part 3. Microcode Customization Planning."

Step 3 Insert the divider page labeled "Worksheet Summary" in front of the Appendixes.

Step 4 Insert the two divider pages labeled "3174 Configuration Questions Reference" into a section of the manual that will be easily accessible, for example, directly in front of the back cover.

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