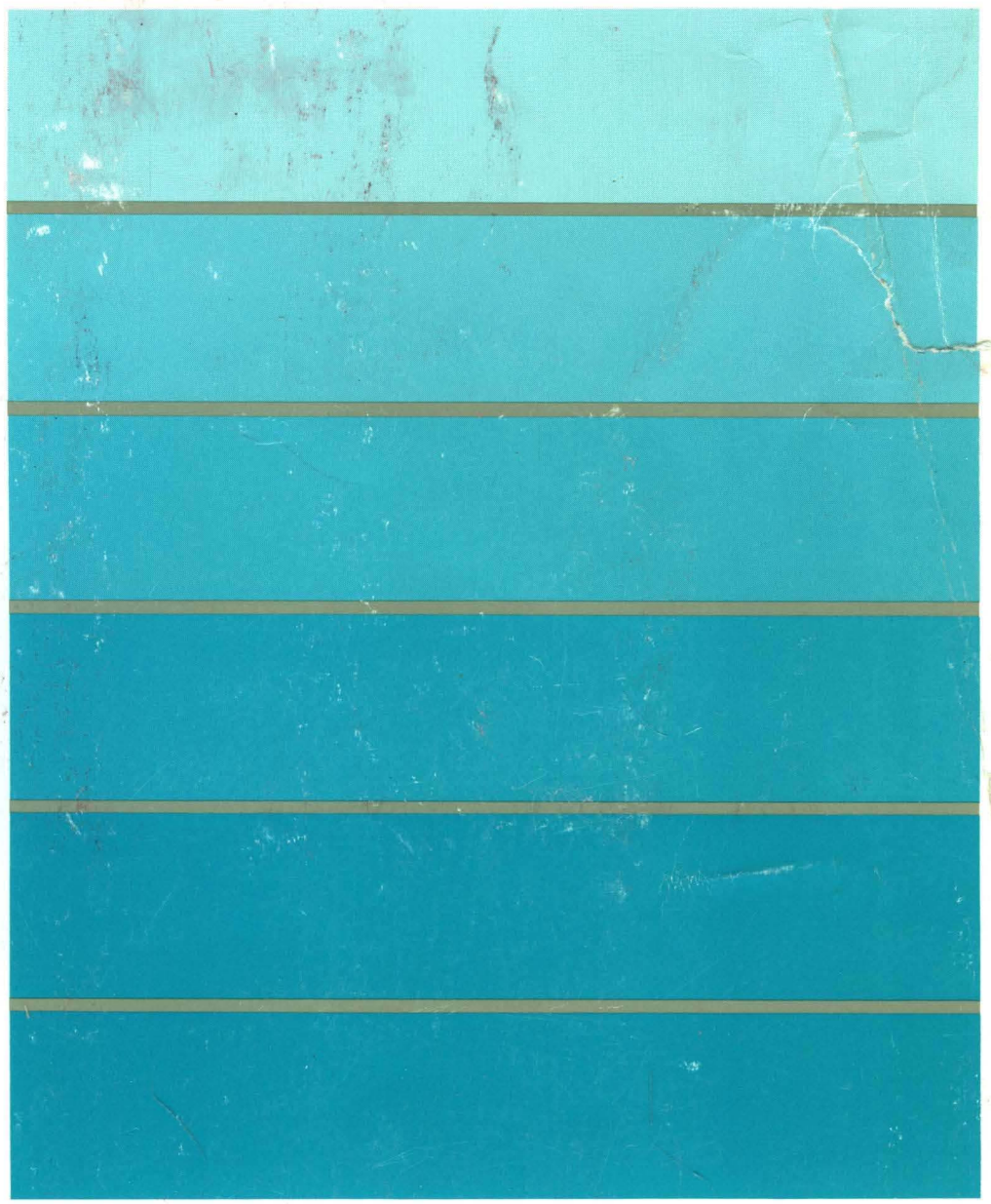
IBM

3174 Establishment Controller

GA27-3850-0

Introduction



3270 Information Display System

3174 Establishment Controller

GA27-3850-0

Introduction

First Edition (April 1989)

This publication introduces and explains the features and functions of the 3270 Information Display System 3174 Establishment Controller. Changes are continually made to the information herein; before using this publication in connection with the operation of IBM systems, refer to the latest IBM System/360 or System /370 SRL Newsletter for the editions that are applicable and current.

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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:

Configuration Support A and S

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

Configuration Support B

Planning Guide, GA27-3862
Utilities Guide, GA27-3863
Central Site Customizing User's Guide, GA23-3868

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
Concurrent Communication Adapter Installation and Removal Instructions, GA27-3851

To Plan for and Use the Asynchronous Emulation Adapter Feature:

Planning Guide, GA27-3844 or GA27-3862
Utilities Guide, GA27-3853 or GA27-3863
Terminal User's Reference for Expanded Functions, GA23-0332

To Use the Multiple Logical Terminals Function:

Planning Guide, GA27-3844 or GA27-3862
Utilities Guide, GA27-3853 or GA27-3863
Terminal User's Reference for Expanded Functions, GA23-0332

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 book introduces the 3174 Establishment Controller. It describes the functions, features, and capabilities of the various controller models. It also provides general information on system and programming support for the 3174 controller.

Who This Book Is For

This book is written for anyone wanting to learn about the IBM 3174 Establishment Controller. It is intended for customer data processing managers and technical planners. It is also for IBM marketing representatives and installation planning representatives.

How This Book Is Organized

This book has five chapters and one appendix:

- Chapter 1, "Introducing the 3174 Establishment Controller"
- Chapter 2, "Features and Functions of the 3174 Controller"
- Chapter 3, "Models of the 3174 Establishment Controller"
- Chapter 4, "System Attachment"
- Chapter 5, "Programming Support"
- Appendix A, "Quick-Reference Tables."

Contents

Chapter 1. Introducing the 3174 Establishment Controller

The IBM 3174 Establishment Controller is part of the IBM 3270 Information Display System family of products. The 3270 display family is known and accepted throughout the computer industry as the standard for end-user-to-host communication. It can also be customized for many different display applications.

The 3174 controller is a fundamental component in the 3270 system. It connects the personal computers, display stations, printers, and other devices to the host processor. It can provide this host connectivity to either an IBM host, an ASCII host—or to both at once, using a variety of connection methods.

There are many kinds of connectivity: device-to-host, device-to-device, device-to-controller, and device-to-network. Some devices are intelligent and can perform some data processing activities themselves; some are dependent and need a controller to run. Some devices and hosts are geared toward one communication protocol, such as ASCII, and others are designed for another protocol, such as 3270. The 3174 connects them all, providing the necessary conversions between communication technologies and managing the networks involved.

This controller is designed to run constantly, monitor its own performance, accept upgrades— whether hardware or microcode—easily, and to be flexible about each customer's unique customizing requirements. The 3174 comes in many different models and supports a wide variety of features and functions. Figure 1-1 on page 1-2 provides an overview of the 3174, its attached components, and its place in the 3270 display system.

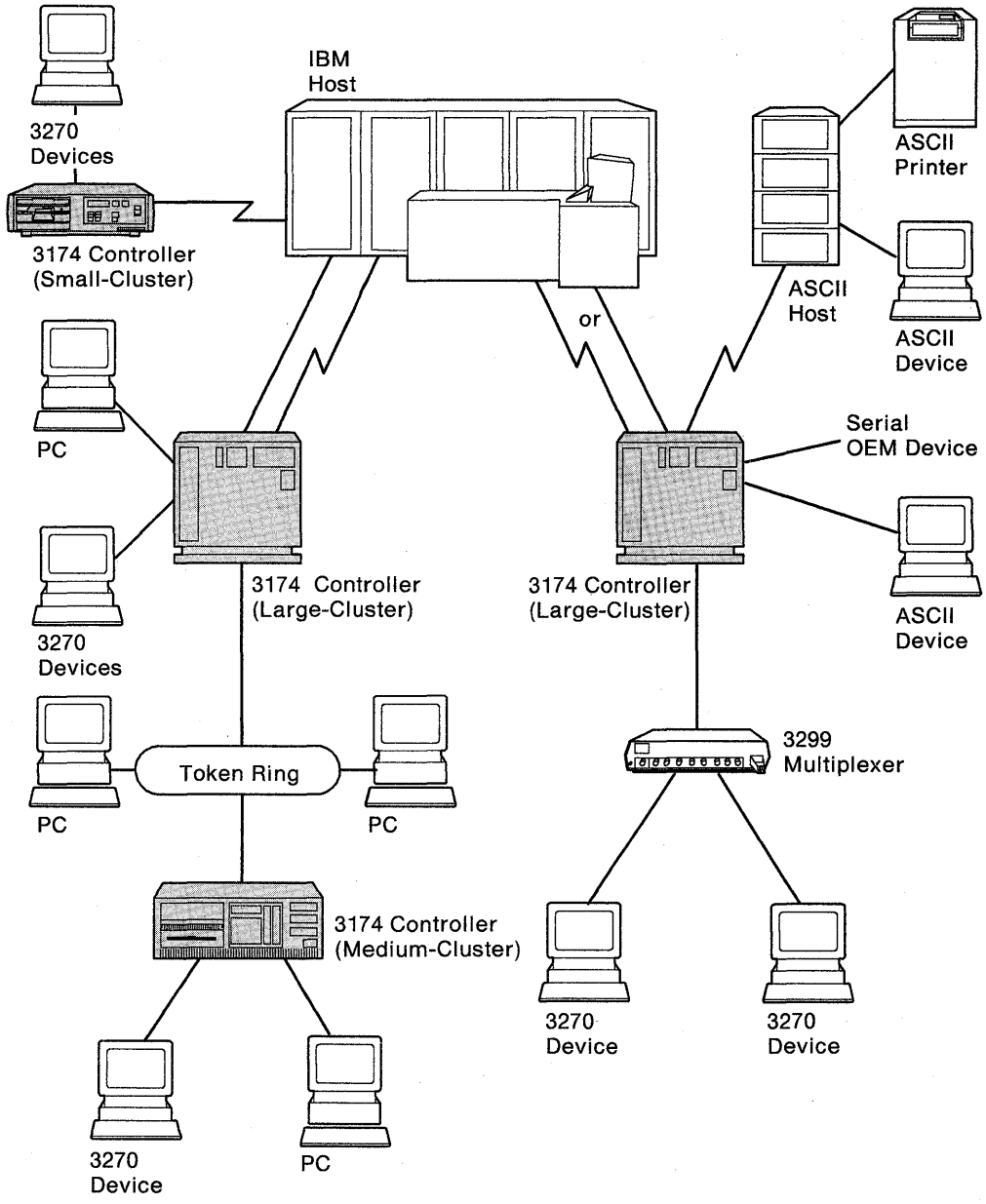

Figure 1-1. Overview of the IBM 3174 Establishment Controller Attachment

Tables of the features, functions, and devices supported by the 3174 are shown in Appendix A, "Quick-Reference Tables." Many of these features and functions are discussed in other parts of the book, but these tables provide a quick-reference point.

Controllers and Terminals

When attached to a controller, display stations, workstations, printers, and personal computers are referred to as **terminals**. The 3174 controller can attach up to thirty-two 3270 terminals and 24 ASCII terminals or hosts directly or up to 250 terminals in a Token-Ring environment.

The controller and its attached terminals are called a **cluster**. Controllers are grouped into three cluster types, based on the number of devices they support.

IBM 3174 Controller Models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R are **large-cluster** controllers. They have a four-port terminal adapter for attaching terminals either directly (four terminals) or using one to four optional Terminal Multiplexer Adapter features (up to 32 terminals). Terminals can also be attached using 3299 Terminal Multiplexers and/or Asynchronous Emulation Adapters (AEA). A multiplexer offers the advantage of connecting eight terminals to one 3174 port. Less cable is needed when the multiplexer is located close to the cluster of eight terminals. An AEA connects eight ASCII terminals or hosts to one 3174 port, and up to three adapter features can be installed in the 3174 (24 ASCII terminals).

Medium-cluster Models 51R, 61R, 52R, 62R, 53R, and 63R have a similar attachment flexibility, but with a maximum of 16 terminals (and eight ASCII terminals). A base unit has a nine-port terminal adapter for attaching terminals either directly (nine terminals), through two 3299 Terminal Multiplexers (sixteen terminals), or a combination of one 3299 (eight terminals) and eight terminals directly attached (for a total of sixteen 3270 terminals) and eight ASCII terminals.

Models 81R, 91R, 82R, and 92R are **small-cluster** controllers. They have a four-port terminal adapter for attaching terminals directly or through a 3299 Terminal Multiplexer. Four terminals can be attached directly, or eight terminals maximum can be attached using a 3299 multiplexer.

Controllers also can be grouped according to their attachment type:

- Locally attached models:
  - 3174 Models 1L and 11L — large cluster
- Remotely attached models:
  - Models 1R, 11R, 2R, 12R, 3R, and 13R — large cluster
  - Models 51R, 61R, 52R, 62R, 53R, and 63R — medium cluster
  - Models 81R, 91R, 82R, and 92R — small cluster.

Programming Support

Several features supported by the 3174 controller determine special host programming needs. For example, the Intelligent Printer Data Stream requires support from host-related programs.

The feature sections and last chapter of this book offer more information about programming support.

Customer Setup

Many components of the 3174 Establishment Controller subsystem are designated as customer setup units. These offer such advantages to the customer as early availability and greater flexibility in the installation and relocation of the components. Each customer setup unit is shipped with specific documentation instructions. For a list of customer setup units, see "Choosing the Right Book from the 3174 Library" on page iii.

Problem Determination

The 3174 Controller, as a component of the 3270 Information Display System, provides specific problem determination procedures as part of its programming network. Some of the devices come with their own problem determination code. For example, the 3299 Terminal Multiplexer and the display stations are shipped with problem determination information. The IBM 3270 Personal Computer is supported by diagnostic aids that are provided on its own diskette.

Diagnostic aids such as those supplied with the IBM 3270 PC are intended for the system operator. Other problem determination procedures are provided at the host end. The following IBM software products provide problem determination procedures at the host:

- NetView™
- Display Exception Management Facility (DEMF)
- Network Error Management Facility (NEMF)
- Facility Error Recognition System (FERS).

NetView is a trademark of International Business Machines Corporation.

Chapter 2. Features and Functions of the 3174 Controller

This chapter describes the abilities of the IBM 3174 Establishment Controller. It explains the features and the basic tasks that these features enable the user to perform.

Different models of 3174 controller support different feature combinations. "Table of Features Supported by Each 3174 Controller" on page A-6 lists the possible feature support provided by each controller model.

Some of the features and functions that IBM supports may not be apparent to the user. This chapter discusses only those that *are* apparent.

The 3174 controller supports the following features and functions:

- Asynchronous Emulation Adapter (AEA)
- 2.4MB diskette drive
- 20MB Fixed Disk Drive
- 16/4Mbps Token-Ring Network Gateway feature
- Type 1 Teleprocessing Communication Adapter
- Type 2 Teleprocessing Communication Adapter
- 4Mbps Type 3 Communication Adapter
- Type 3A Dual speed (16/4Mbps) Communication Adapter
- Base memory on new/existing models
- Storage Expansion
- Encrypt/Decrypt Adapter
- Concurrent Communication Adapter (CCA)
- Single Link Multi-Host Support
- Central Site Customizing Utility (CSCU)
- Central Site Change Management (CSCM)
- Intelligent Printer Data Stream (IPDS)
- Multiple Logical Terminals (MLT)
- Country Extended Code Page (CECP)
- Response Time Monitor (RTM)
- Terminal Multiplexer Adapter (TMA)
- Network Asset Management
- Serial Original Equipment Manufacture Interface (SOEMI).

Some of the features and functions are dependent upon the microcode configuration type. For lists of the specific features and functions offered by each microcode configuration type, see "Microcode Support" on page 2-17.

Asynchronous Emulation Adapter (AEA) Feature for ASCII Connectivity

The Asynchronous Emulation Adapter (AEA) Feature consists of both hardware and microcode and requires a second diskette drive or one fixed disk drive.

This adapter expands the connection capability for IBM 3270 display stations and printers, allowing them to connect to ASCII hosts and public data networks, as well as allowing ASCII display stations and printers to connect to IBM and ASCII hosts. Figure 2-1 shows an overview of 3270 and ASCII terminal emulation.

- Three emulation adapters can be installed in Models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R of the 3174, for a total of 24 ASCII ports.

  These device attachments are in addition to the maximum of thirty-two 3270 terminals.

- One emulation adapter can be installed in Models 51R, 61R, 52R, 62R, and 63R of the 3174, for a total of eight ASCII ports.

  These device attachments are in addition to the maximum of sixteen 3270 terminals. The number of device addresses supported by non-SNA controllers is 16.

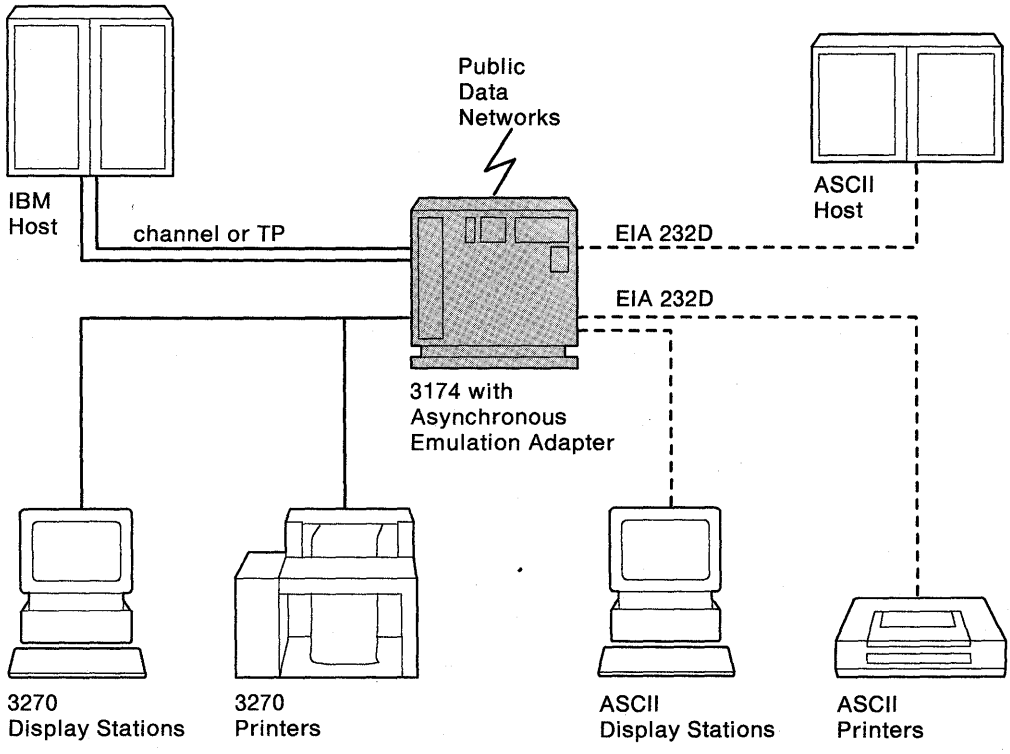

Figure 2-1. Overview of 3270 and ASCII Terminal Emulation

Functional Description

The Asynchronous Emulation Adapter provides three major functions:

ASCII terminal emulation (IBM 3270 terminals emulating an IBM 3101 Display Station, a DEC VT-100[1], or an ASCII printer for connection to ASCII hosts or public data networks)

3270 terminal emulation (ASCII terminals emulating 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 passthrough (ASCII terminals connecting to ASCII hosts or to public data networks).

The Asynchronous Emulation Adapter supports character-mode, asynchronous transmission of 7-bit ASCII (ANSI 3.4,1977) data with parity. Odd, even, mark, space, and no-parity coding are supported. Ports can be configured in combinations of ASCII terminal emulation, 3270 terminal emulation, or ASCII passthrough. Each port provides an EIA232D electrical interface and supports transmission speeds of 300, 1200, 2400, 4800, 9600, and 19 200 bits per second (bps) through modems over switched or nonswitched communication facilities or through direct connection (without modems).

ASCII Emulation

Terminal: The following display stations are supported for ASCII terminal emulation: IBM 3178, 3179 (Model 1 only), 3180, 3191, 3278, 3279 (operating in four-color mode), and 3270 Personal Computers operating in control unit terminal (CUT) mode.

Keyboard: The IBM typewriter, APL, and text keyboard types are supported through special keyboard maps for the IBM 3101 and DEC VT-100 display stations.

Printer: The IBM 3230 Model 2, 3262 Model 3 or 13, 3268 Model 2, and 3287 Model 1 or 2 are supported for ASCII printer emulation. ASCII control sequences for the following functions are supported: line feed, form feed, carriage return, bell, and tab-skip to the next multiple of 8 characters. The 3270 printer in this mode is used only as a host printer.

Host Attachment: ASCII host attachment is through any of the adapter ports, as specified during customization of the 3174.

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[1] Trademark of the Digital Equipment Corporation.

3270 Emulation

Terminal: The following ASCII display stations are supported for 3270 terminal emulation:

- IBM 3101
- IBM 3151 as a 3161 or 3162, depending on the model
- IBM 3161
- IBM 3162
- IBM 3163 (supported as a 3161)
- IBM 3164
- DEC VT-52
- DEC VT-100
- DEC VT-220 (emulating a VT-100)
- DEC VT-241
- DEC VT-420
- TeleVideo 912[2] and 970
- Lear Siegler ADM[3] 3A, 5, 11, 12, 11/78
- ADDS Viewpoint[4] A-2
- ADDS Viewpoint 78
- Esprit 78[5]
- Esprit-Hazeltine[6] 1500
- Hewlett Packard[7] 2621-B.

Note: ASCII display stations supported for 3279 2A emulation are the IBM 3164 and the DEC VT-241.

Compatible terminals that meet the requirements for attachment may connect to the emulation adapter under the provisions of the IBM Multiple Supplier Systems Bulletin.

Personal computers operating in emulation mode as one of the above display stations can also attach to the 3174 controller, provided that an emulation program is available and that it is compatible with one of the emulation adapter's keyboard maps.

Keyboard: The user can choose between a generic keyboard map and a specific map designed for each ASCII terminal supported.

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2 TeleVideo is a trademark of TeleVideo Systems, Inc.

3 ADM is a trademark of Lear Siegler, Inc.

4 Viewpoint is a registered trademark of Applied Digital Data Systems, Inc.

5 ESPRIT 78 is a trademark of Esprit Systems, Inc.

6 Hazeltine is a trademark of Hazeltine Systems Inc.,

7 Hewlett Packard is a trademark of Hewlett Packard.

Printer: The general requirements for ASCII printers to be supported for 3270 printer emulation (LU1 SNA character string [SCS] mode and/or LU3 3270 Information Display System data stream compatibility [DSC] mode) are as follows:

- Serial transmission
- Equal transmit and receive speeds, which must be in the range of speeds supported on the emulation adapter
- Duplex character mode
- 7-bit code defined by ASCII (ANSI 3.4, 1977)
- EIA 232D electrical interface
- A maximum of 132 print positions
- ASCII commands supported:
  - Carriage Return (Control M; hex OD)
  - Line Feed (Control H; hex OA)
  - Bell (Control G; hex O7)
- Carriage return must not generate a line feed, nor can a line feed generate a carriage return.
- The printer must not be dependent on any delay characters to allow mechanical motion.

Printers connected in this mode can be used as host printers, shared printers, and local copy printers.

Host Attachment: IBM host attachment is through the host attachment interface of the 3174 in which the adapter is installed.

Operator Indicator Line: Operator indicator status is provided upon request on the 24th or 25th line of the ASCII display station.

RTM and Alert: Network statistics for ASCII terminals are gathered in the same manner as 3270 terminals connected to the 3174.

ASCII Passthrough

The emulation adapter can provide the connection between an ASCII terminal and an ASCII host, using any ASCII host-configured port. Flow controls supported by the adapter will prevent potential data overruns if supported by the host connection. If an overrun does occur, a message is sent to the display station operator. Error checking is the responsibility of the ASCII host.

General Items Common to ASCII and 3270

Destination Menu: Prompts help the user determine how to connect with the desired host application.

Modems: Supported are all unswitched-line, limited-distance, and switched-line modems that provide duplex asynchronous operation, support equal transmit and receive speeds, and conform to EIA232D specifications on pins 1 to 8, 20, and 22. Connections can be made through "smart" modems, such as the IBM 5841.

Transmission on/transmission off (XON/XOFF), data terminal ready (DTR), and clear to send (CTS) asynchronous flow controls are supported.

Security: Password access to the adapter is provided, and session security is supported. When an ASCII device is in session with an IBM host and either disconnects or exceeds the configurable inactivity timer, the 3174 terminates the session. Security cannot be provided for host subsystems or applications (such as the Information Management System [IMS]) that retain data between sessions in the expectation that the same logical unit will come into session again.

If sensitive data is sent over external communication facilities, an encryption scheme outside the capabilities of this feature should be used.

2.4MB Diskette Drive and 2.4MB Diskette

Either a 2.4MB diskette drive or a 1.2MB diskette drive is supported on all models of the controller. Some models support both.

The 1.2MB diskette drive is supported on all models of the 3174. Models 1L, 1R, 2R, 3R, 51R, 52R, and 53R can be upgraded from a 1.2MB to a 2.4MB diskette drive. Models 81R and 82R cannot.

Models 11L, 11R, 12R, and 13R that are ordered with Configuration Support-A or -S, Release 5.0, are shipped with a 1.2MB diskette drive. In this case, these models do not support the 2.4MB diskette drive.

If Models 11L, 11R, 12R, and 13R are ordered with Configuration Support-B, they are shipped with a 2.4MB diskette drive. If a second drive is installed, it must be a 2.4MB diskette drive.

For Configuration Support-A, -S, Models 61R, 62R, and 63R are shipped with a 2.4MB diskette drive. If a second drive is installed, it must be a 1.2MB drive. For Configuration Support-B, these models are shipped with a 2.4MB drive, and a second drive must be a 2.4MB diskette drive. Models 81R and 82R are shipped with a 1.2MB diskette drive; Models 91R and 92R are shipped with a 2.4MB diskette drive. Models 81R, 91R, 82R, and 92R do not support a second diskette drive.

The 2.4MB diskette drive supports 2.4MB diskettes and 1.2MB diskettes. The 1.2MB diskette drive does not support 2.4MB diskettes.

20MB Fixed Disk Drive

The 20MB Fixed Disk Drive can be installed in all models of the 3174 except models 81R, 91R, 82R, and 92R. This feature is functionally equivalent to the diskette drives available for the 3174. The advantage of this feature is the increased direct access storage device (DASD) storage, which also increases usability by reducing diskette swapping.

Two fixed disk drives can be installed on 3174 Models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R, and one can be installed on models 51R, 61R, 52R, 62R, 53R, and 63R. The 20MB Fixed Disk cannot be installed on controller models 81R, 91R, 82R, or 92R.

16/4Mbps Token-Ring Network Gateway feature

The gateway feature provides for data passage between an SNA/SDLC host processor and workstations and controllers that are attached to the IBM Token-Ring Network. The gateway feature will operate on an IBM Token-Ring Network at either 16 or 4Mbps.

The feature can be installed in any of the following controllers: 1L, 11L, 1R, 11R, 2R, 12R, 51R, 61R, 52R, and 62R. The gateway feature does not interfere with the ability of ring-attached devices to communicate with each other on the ring; nor does it affect terminals directly attached to the gateway 3174.

Many workstations can be defined to the host VTAM because of the gateway feature. Depending upon the configuration and controller models involved, it is possible that up to 250 Token-Ring-attached workstations or controllers can be defined to VTAM. The addresses are mapped to unique host subchannel or SDLC addresses. One subchannel or SDLC address is also required for the controller in which the gateway feature is installed.

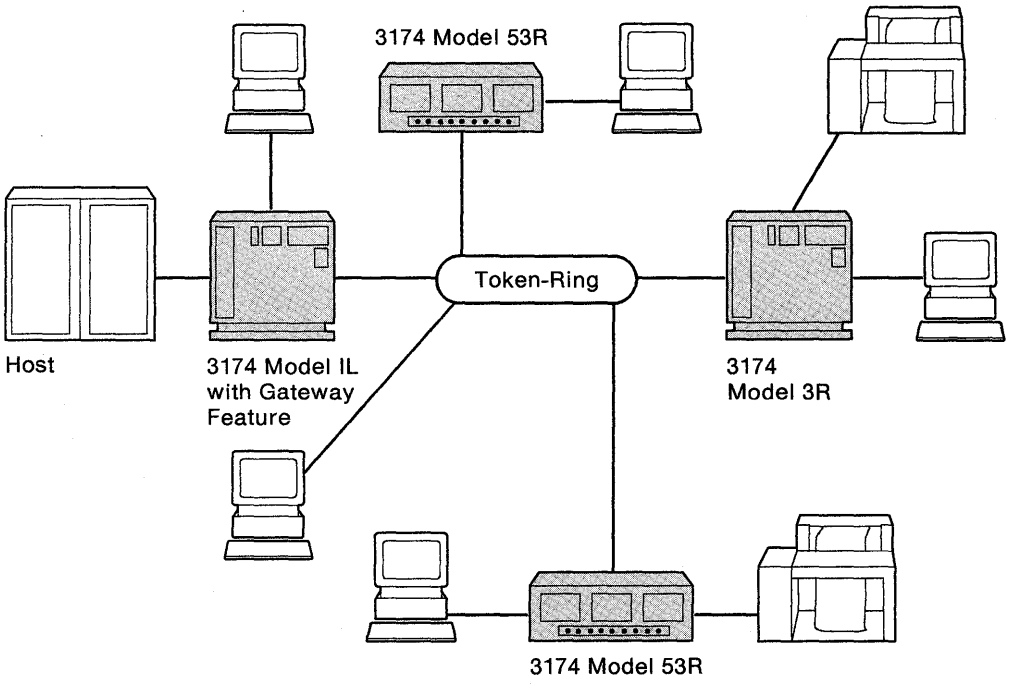

Figure 2-2. IBM Token-Ring Network

Host—Gateway Relationship

Adding the gateway feature to the system requires no changes in the host application program. Nor is there any effect upon normal 3174 Establishment Controller functions.

3174—Workstation Relationship

Adding the gateway feature does not affect normal 3174 functions for terminals attached to the control unit terminal (CUT) and distributed function terminal (DFT) interface. (These terms are explained in "Terminals" on page 2-19.)

Gateway Feature Components

The gateway feature is made up of:

- A Type 3A Dual Speed (16/4Mbps) Communication adapter in the 3174 controller
- Utility and Control diskettes for Configuration Support-S (see note)
  or
  Configuration Support-B
- Cable.

Additional storage is needed with this feature.

The gateway feature can be ordered with the 3174 Establishment Controllers, or it can be installed by the customer.

Note: Release 2 or higher of Configuration Support-S is required for remote 3174 Models 1R, 11R, 2R, 12R, 51R, and 62R.

Type 3A Dual Speed (16/4Mbps) Communication Adapter

The type 3A adapter serves as the attachment between the 3174 and the Token-Ring Network and provides for:

- Transfer of data to and from the ring
- Detection of ring and protocol errors.

Microcode

Configuration Support-S Utility and Control diskettes are provided with the gateway feature. Configuration Support-B diskettes may be purchased. All configuration support for 3174 functions applicable to the SNA 3174 is included.

The Utility diskette provides the ability to:

- Customize the 3174 Establishment Controller
- Assign a ring address for the controller containing the gateway feature
- Map the addresses of workstations or controllers attached to the Token-Ring Network to specific subchannel or SNA/SDLC addresses.

The Control diskette contains the microcode needed to connect and manage a Token-Ring Network downstream from the controller.

The screen images used for customizing the gateway feature have the same format and interface used for customizing the 3174.

Program Support

The gateway feature is supported by the following host-related programs:

- NetView
- Virtual Telecommunications Access Method (VTAM).

NetView and VTAM run under the following operating systems:

- Multiple Virtual Storage (MVS)
- Virtual Machine (VM)
- Virtual Storage Extended (VSE).

Problem Determination

The gateway feature provides ring-related error processing for the Token-Ring Network, as well as extensions of the following 3174 problem determination functions:

- Alerts
- Online tests
- Offline tests
- Error logging
- Trace.

In addition, host notification is provided for Token-Ring error-threshold conditions.

Type 1 Teleprocessing Communication Adapter

The Type 1 Teleprocessing Communication Adapter provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment to the host. The adapter is optional on models 1L, 11L, 3R, and 13R. It is a base feature on these models: 1R, 11R, 51R, 61R, 81R, and 91R. With the adapter installed and with appropriately configured microcode loaded, the 1L, 11L, 3R, and 13R can operate on teleprocessing facilities as either model 1R or 11R.

Type 2 Teleprocessing Communication Adapter

The Type 2 Teleprocessing Communication Adapter provides X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment to the host. The adapter is optional on models 1L, 11L, 3R, and 13R. It is a base feature on these models: 2R, 12R, 52R, 62R, 82R, and 92R. With the adapter installed and with appropriately configured microcode loaded, the 1L, 11L, 3R, and 13R can operate on teleprocessing facilities as either model 2R or 12R.

4Mbps Type 3 Communication Adapter

This adapter provides the ability to operate on an IBM Token-Ring at 4Mbps. It is a base feature on models 3R and 53R. It is an optional feature on models 1L, 1R, 2R, 51R, and 52R. This adapter enables these controllers to act as models 3R or 53R for Token-Ring Network communication. (See "Table of Alternate Controller Configurations" on page A-8 for a table showing which models convert to which models.) If the Token-Ring Gateway feature is ordered, this adapter comes with the feature. It can also be ordered separately.

Type 3A Dual Speed (16/4Mbps) Communication Adapter

This adapter provides the ability to operate on an IBM Token-Ring Network at either 16Mbps or 4Mbps. If the 16/4Mbps Token-Ring Network Gateway feature is ordered, this adapter comes with the gateway feature. It can also be ordered separately.

This adapter is a base feature on models 13R and 63R. It is optional on these models: 1L, 11L, 1R, 11R, 2R, 12R, 3R, 51R, 61R, 52R, 62R, and 53R.

Storage

Large-cluster models 11L, 11R, 12R, and 13R of the 3174 controller have 2MB of base storage. (One MB equals 1 048 576 bytes.) Models 1L, 1R, 2R, and 3R have 1MB of base storage. Medium-cluster models 51R and 53R have 1MB; models 61R, 62R, and 63R have 2MB of base storage. Model 52R has 512KB of base storage.

Of the small-cluster controllers, models 81R and 82R have 1MB base storage, and the 91R and 92R have 2MB.

Each controller model has one diskette drive. The following models have a 2.4MB diskette drive: 11L, 11R, 12R, 13R, 61R, 62R, 63R, 91R, and 92R. Other models have a 1.2MB diskette drive. Each diskette drive supports 5-1/4-inch, high-capacity diskettes. Large- and medium-cluster controllers can have a second diskette drive or a 20MB Fixed Disk.

These storage features are designed to support all basic functions. For information about additional features and storage needs, refer to the next section.

3174 Storage Expansion

Some functions and features that controller models support may require additional storage. For example,

- Token-Ring Network Gateway feature
- Central site change management utility
- Downstream load (DSL)
- Asynchronous Emulation Adapter
- Multiple Logical Terminals
- Single Link Multi-Host Support

all require some form of additional storage.

Controllers provide for storage expansion in different ways, depending upon the model type. Large-cluster models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R have two card slots reserved for storage expansion; medium-cluster models 51R, 52R, and 53R have one card slot reserved. Medium-cluster models 61R, 62R, and 63R have one module slot reserved for storage expansion. Small-cluster controllers do not support this feature.

The 3174 Storage Expansion Feature card is available in either 1MB size or 2MB size. The cards, in combination with 3174 base storage, can provide different maximum storage amounts for controllers supported by different configuration types.

Large-cluster models 11L, 11R, 12R, and 13R have 2MB base storage in one card slot. Two other slots can hold storage expansion cards that can provide a possible total of 6MB. However, if these controller models run under Configuration Support-A or -S Release 5.0, 4MB of that possible total is supported. If the controller models are supported by Configuration Support-B, 6MB of storage is supported.

Large-cluster models 1L, 1R, 2R, and 3R have 1MB base storage in one card slot. Two other slots can hold storage expansion cards that provide a possible total of 6MB (if a 2MB card replaces the 1MB card in the first slot). However, if these controller models run under Configuration Support-A or -S Release 5.0, 4MB of that possible total is supported. If the controller models are supported by Configuration Support-B, 6MB of storage is supported.

Medium-cluster models 51R and 53R have 1MB of base storage. As much as 2MB of storage can be added to this base amount (using the one card slot) for a possible total of 3MB. The Model 52R has 512KB of base storage. Storage can be expanded on this model to a maximum of 1.5MB.

Medium-cluster models 61R, 62R, and 63R have 2MB of storage and can be expanded to as much as 4MB (using the one module slot).

Storage expansion is not supported in the small-cluster models of the controller. Models 81R and 82R have 1MB of base storage, and models 91R and 92R have 2MB of base storage.

Encrypt/Decrypt Adapter

The Encrypt/Decrypt Adapter feature is supported in the following:

- Configuration Support-A (Release 3 and higher)
- Configuration Support-S (Release 4 and higher).

It is supported on models 1R, 2R, and 3R.

Concurrent Communication Adapter (CCA)

The Concurrent Communication Adapter (CCA) enables large- and medium-cluster controllers to communicate simultaneously with additional host processors. Each processor card provides one additional communications link. When the Concurrent Communication Adapter is installed in a controller, the terminals attached to the controller can communicate with each host to which the controller is attached, with the exception of ASCII terminals.

An optional feature, the Concurrent Communication Adapter does not affect compatibility with existing host interfaces, host software or protocols, or 3174 features and functions. Small-cluster controllers do not support this adapter, and medium-cluster models 52R and 53R do not support it. It is optional on all other models. For more information about the Concurrent Communication Adapter, see your IBM marketing representative.

Single Link Multi-Host Support

Whereas the Concurrent Communication Adapter is an installable feature, Single Link Multi-Host Support is provided entirely in the microcode. It is accessed through a customization option.

Single Link Multi-Host Support provides access to a maximum of eight IBM host processors that are attached to the same Token-Ring Network. This access is concurrent and enables any terminals that are attached to a 3174 model 3R, 13R, 53R, or 63R to communicate with up to five of the hosts on the network. (Up to eight hosts can be linked to these controllers; the attached terminals can communicate with up to five of the eight hosts.)

Customizing for this option does not affect compatibility with existing host interfaces, host software or protocols, or 3174 features and functions. Non-gateway controllers that connect to a Token-Ring Network support this option. They are models 3R, 13R, 53R, and 63R.

Note: Other models that can be alternately configured to act as these models can support this option. See "Table of Alternate Controller Configurations" on page A-8.

For more information about the Single Link Multi-Host Support option, see your IBM marketing representative.

Central Site Customizing Utility (CSCU)

With Central Site Customizing (see Figure 2-3), one set of microcode update diskettes is sent to the central site for use in creating updated diskettes that are distributed to network controllers. This is actually accomplished through a diskette utility program that allows for generating, maintaining, and storing customizing parameters, and for generating customized microcode for all the network controllers.

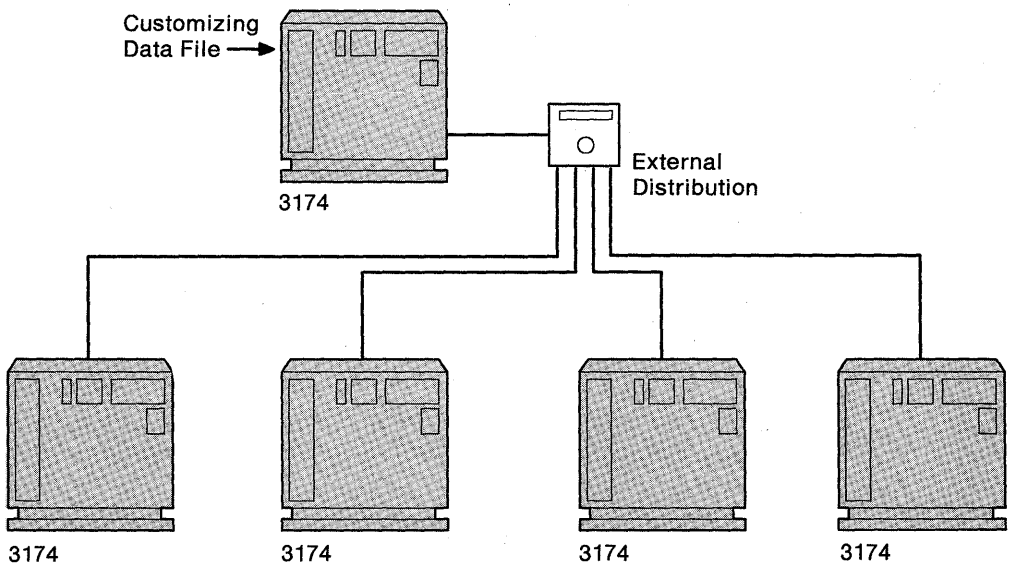

Figure 2-3. Central Site Customizing – Manual Distribution

Function

Central Site Customizing provides the ability to create and maintain, at a central site, a library that contains customizing parameters for all the 3174 controllers in a network. Central Site Customizing also makes it possible to generate customized diskettes for the network 3174s.

File Maintenance

File maintenance for central site customizing includes the ability to:

- Create and maintain customizing records for all 3174 controllers on a controller-by-controller basis
- Select customizing data records for generating diskettes on a controller-by-controller basis.

Hardware Requirements

Central Site Customizing can be performed from all models of the 3174 except models 81R, 91R, 82R, or 92R. The Central Site Customizing Utility (CSCU) requires that the controller:

- Be offline
- Have a 3278 or similar terminal attached to port 0
- Have two diskette drives or one diskette drive and one fixed disk drive.

Host Support

No host support is required for Central Site Customizing. The ability to customize controllers is supported, regardless of host protocols.

Central Site Change Management (CSCM)

Central site change management (CSCM) allows the user to electronically distribute customization parameters or microcode data to Systems Network Architecture (SNA) 3174 controllers that are serviced from a central site. CSCM requires the Central Site Customizing Utility to establish and maintain the central site library on a 3174 (except Model 81R, 91R, 82R, or 92R) that has been designated as the central site controller.

Note: If any of the large- or medium-cluster controllers supporting Central Site Customizing is configured for the gateway feature, it cannot be the central site controller. It can, however, be a network controller. Small-cluster controllers cannot be central site controllers.

The customization parameters or data are electronically distributed by Version 1 Release 2 of NetView Distribution Manager installed in the central site MVS/370 or MVS/XA host. NetView DM uses LU 6.2 support provided in ACF/VTAM Version 3 Release 2, and defined protocols for managing changes and data distribution using an enhanced Systems Network Architecture Distribution Services (SNADS) format.

Customization parameters (the parameters contained in the central site library) are distributed electronically to an SNA 3174 controller without disrupting normal workstation operations. Activation of the electronically delivered parameters will require an initial microcode load (IML) of the 3174 controller. Electronic distribution of other data such as patches, new microcode engineering change release levels, Request for Price Quotations (RPQs), or downstream load (DSL) device code may require network site intervention, depending on the 3174 model or the choice of hardware features in the remote 3174.

CSCM also makes it possible to re-IPL the remote 3174 from the central site, significantly reducing the need for manual intervention at the remote site.

Although not required, the 20MB Fixed Disk Drive feature is desirable for the 3174 controllers that will participate in central site change management. At central site controllers, the 20MB Fixed Disk Drive improves usability by eliminating diskette swapping when libraries for large networks are being maintained. For remote controllers, it allows a backup copy of the current IML Control disk microcode to be retained when migrating to a new microcode release.

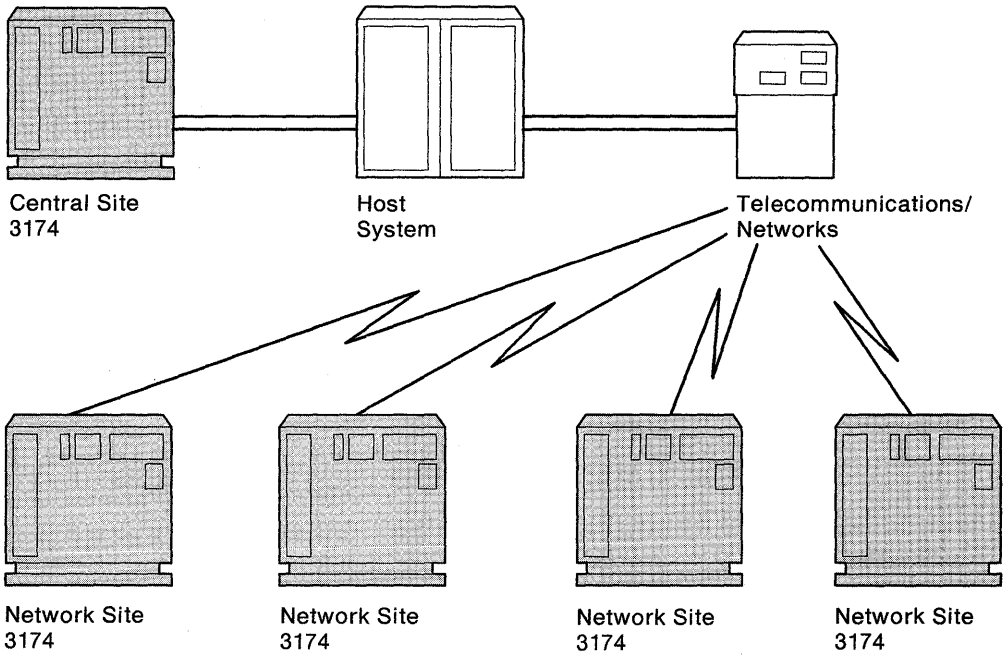

Figure 2-4. Electronic Distribution Using Central Site Change Management

Intelligent Printer Data Stream (IPDS)

The Intelligent Printer Data Stream (IPDS) is a structured field data stream designed to manage and control printer processes. (See Figure 2-5.) It is easily distinguished from previous printer data streams in that it supports all points addressability (APA). The APA printing concept allows users to position text, images, vector graphics, bar codes, and previously stored overlays at any point on a page.

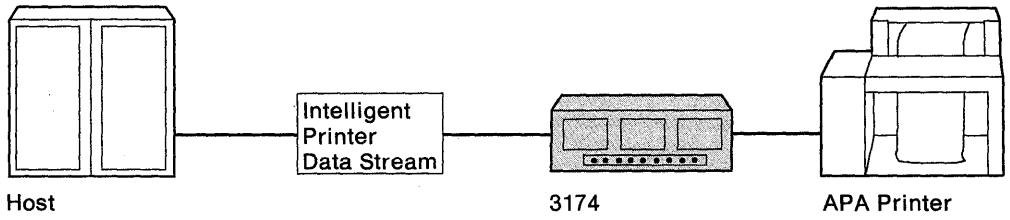

Figure 2-5. Intelligent Printer Data Stream

Functional Description

The IPDS is transmitted from an application program to the printer within structured fields that have been specifically designed for that purpose. The IPDS commands within the data stream enable the host to control:

- Media handling
- Downloading and managing of symbol sets (fonts) and printer-stored objects, such as overlays and page segments.

The printer can later use the stored objects to construct a printed page. The IPDS can significantly reduce the load on the host processor and the number of characters transmitted to the printer in many advanced printing applications.

System Attachment

The IPDS is supported by:

- IBM 3174 Establishment Controller Configuration Support-A (Release 2 or higher)
- IBM 3174 Establishment Controller Configuration Support-S (Release 4 or higher)
- IBM 3174 Establishment Controller Configuration Support-B (Release 1).

Printers capable of IPDS will be supported by both SNA and non-SNA controllers. Attachment protocols are as follows:

- SNA
  - Channel-attached
  - SDLC-attached.

Note: Under SNA, support is limited to LU 1 only.

- Non-SNA
  - Channel-attached
  - BSC-attached.

Note: Under non-SNA, IPDS is carried only in the 3270 data stream.

Programming Dependencies

The IPDS depends on programming support outside the 3174 controllers.

The IPDS is dependent on VTAM/NCP to support printer operations to a BSC-attached controller. It does not depend on the presence of a write control character (WCC) to indicate "start print" in the data stream.

Error Reporting and Recovery

The IPDS exception conditions are detected by the attached printer and are reported (at the data stream level) to the application program that generated the IPDS data. The exception conditions are reported in an IPDS structured field called *Acknowledge (ACK) Reply*.

The controller has no knowledge of printer-detected IPDS exceptions and does not take part in recovery except as directed by the application program.

Multiple Logical Terminals (MLT)

Multiple Logical Terminal (MLT) support is a feature of Configuration Support-A (Release 3 and higher), Configuration Support-S (Release 2 and higher), and Configuration Support-B microcode. It enables IBM 3270 CUT displays that are attached to any model IBM 3174, regardless of host connection protocol, to interact with up to five host sessions, depending upon the configuration support level. The host sessions can be directly connected to a single IBM host and one or more ASCII hosts. Each session can be connected to only one host at a time.

Country Extended Code Page (CECP)

The Country Extended Code Page (CECP) feature is an extension of each Latin-based national language code page, to a 191-code-point language code page for the countries listed below. When used in conjunction with CECP-capable displays and printers, CECP allows you to use symbols from languages other than the one for which the 3174 controller is customized. The Country Extended Code Page feature is supported by each release of Configuration Support-A (Release 4 or higher), and each release of Configuration Support-S (Release 4 or higher). The national languages supported by CECP are listed in the following table:

Table 2-1. CECP-supported National Languages

Austrian/German (EBCDIC 76)	Netherlands
New Belgian (International)	Norwegian
Canadian Bilingual	Portuguese
Danish	Spanish
English (UK)	Spanish-Speaking
English (US)	Swedish
Finnish	New Swiss/French (International)
French AZERTY (105)	New Swiss/German (International)
Italian	

Response Time Monitor (RTM)

The Response Time Monitor (RTM) provides a way to measure, record, and display end-user response time. It records the time lapse between the operator's pressing the Enter key and the host's handling the data and returning it to the display screen. When this information has been gathered over a period of time, it produces response time statistics that are useful for network management and evaluation.

Terminal Multiplexer Adapter (TMA)

The Terminal Multiplexer Adapter (TMA) multiplexes the data streams from eight 3270 devices into a single cable. It is supported on models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R. Each controller can support up to four TMAs. Each TMA has eight ports, allowing up to thirty two 3270 terminals to be attached to a controller.

Network Asset Management

Network Asset Management supports host requests for Vital Product Data (VPD) information from a SNA 3174 controller and attached devices. It runs on an SNA network and enables the host to dynamically request the collection of product identification information (such as serial numbers) from supported network components. The information is available to the host as soon as the request is made.

Serial Original Equipment Manufacture Interface (SOEMI)

The Serial Original Equipment Manufacture Interface (SOEMI) extends the attachment capabilities of the 3174 controller to include independently manufactured devices. Designed to provide for engineering, scientific, and manufacturing environments, this interface provides the means for communication between the 3174 controller and OEM devices. The OEM devices appear to the 3174 as being no different from other devices.

Microcode Support

The three types of configuration support offered by IBM provide support for 3174 features and enhancements. Each of the next three sections lists a configuration type and the features and functions for which that configuration type provides support.

IBM 3174 Configuration Support-A

Configuration Support-A Release 5 provides microcode support for the following:

- Asynchronous Emulation Adapter (AEA)
- 2.4MB diskette drive
- 20MB Fixed Disk Drive
- Type 3A Dual Speed (16/4Mbps) Communication Adapter
- Type 1 Teleprocessing Communication Adapter
- Type 2 Teleprocessing Communication Adapter
- 4Mbps Type 3 Communication Adapter
- Storage Expansion

- Central Site Customizing Utility (CSCU)
- Central site change management (CSCM)
- Intelligent Printer Data Stream (IPDS)
- Multiple Logical Terminals (MLT)
- Country Extended Code Page (CECP)
- Response Time Monitor (RTM)
- Terminal Multiplexer Adapter (TMA)
- Network Asset Management
- Serial Original Equipment Manufacture Interface (SOEMI)
- Encrypt/Decrypt Adapter.

IBM 3174 Configuration Support-S

Configuration Support-S Release 5 provides microcode support for the following:

- Asynchronous Emulation Adapter (AEA)
- 2.4MB diskette drive
- 20MB Fixed Disk Drive
- Type 3A Dual Speed (16/4Mbps) Communication Adapter
- Type 1 Teleprocessing Communication Adapter
- Type 2 Teleprocessing Communication Adapter
- 4Mbps Type 3 Communication Adapter
- Storage Expansion
- Central Site Customizing Utility (CSCU)
- Central site change management (CSCM)
- Intelligent Printer Data Stream (IPDS)
- Multiple Logical Terminals (MLT)
- Country Extended Code Page (CECP)
- Response Time Monitor (RTM)
- Terminal Multiplexer Adapter (TMA)
- Network Asset Management
- Serial Original Equipment Manufacture Interface (SOEMI)
- Encrypt/Decrypt Adapter
- 16/4Mbps Token-Ring Network Gateway feature.

IBM 3174 Configuration Support-B

Configuration Support-B Release 1 provides microcode support for the following:

- Asynchronous Emulation Adapter (AEA)
- 2.4MB diskette drive
- 20MB Fixed Disk Drive
- Type 3A Dual Speed (16/4Mbps) Communication Adapter
- Type 1 Teleprocessing Communication Adapter
- Type 2 Teleprocessing Communication Adapter
- 4Mbps Type 3 Communication Adapter
- Storage Expansion
- Central Site Customizing Utility (CSCU)
- Central site change management (CSCM)
- Intelligent Printer Data Stream (IPDS)
- Multiple Logical Terminals (MLT)
- Country Extended Code Page (CECP)
- Response Time Monitor (RTM)
- Terminal Multiplexer Adapter (TMA)
- Network Asset Management

- Serial Original Equipment Manufacture Interface (SOEMI)
- 16/4Mbps Token-Ring Network Gateway feature
- Concurrent Communication Adapter (CCA)
- Single Link Multi-Host Support option.

Local Customization

All 3174 controller models have either a 1.2MB or 2.4MB high-capacity diskette drive. Microcode diskettes are shipped with each controller. These diskettes are used to generate an IML disk (either a diskette or a fixed disk) which supports the configuration of display stations and printers on your system. The IML disk gives the 3174 all of the information about the system that is necessary when power is turned on. To customize a disk, the operator follows a documented procedure for typing in the system configuration features at the keyboard of a control unit terminal (attached to the controller).

A disk that has been customized by a user can be recustomized to remove features or meet the changing needs of his system. Backup IML diskettes can be generated with a similar procedure.

Terminals

The 3174 controller provides for the 3270 system's attachment to a data processing system and the operation of attached terminals. The attached terminals may be either of two kinds: distributed function terminals (DFTs) or control unit terminals (CUTs).

Distributed function terminals (DFTs) interpret the data stream and execute functions independently of the 3174 controller. The 3174 passes outbound information from the host to the terminal; upon the terminal's request, the 3174 then transmits data prepared by the terminal inbound to the host.

Control unit terminals (CUTs) cannot interpret the data stream themselves, nor can they execute functions independently of the controller. The 3174 interprets the data stream and executes functions for the control unit terminal.

Displays

Many models of display stations are supported by the 3174 controller (see the "Table of 3174 Controller Devices" on page A-1). The display models differ in:

- Screen size
- Character size
- Spacing between lines of type
- Character color
- Background color.

Displays also have many common characteristics. All models follow the same architecture and share a common data stream format. Other shared characteristics include:

- Ability to adjust screen brightness
- Etched or filter-bonded screen surfaces
- Clear, stable screen imaging.

Keyboards

For each 3270 display station there are several IBM keyboards, each with a key layout designed to suit a particular job—such as word processing, data entry, or programming. For some display models, you can define your own keyboard layouts. All the keyboards have alphabetic keys, numeric keys, special symbol keys, and control keys for entering information.

Alphanumeric, special symbol, and cursor-positioning keys are typematic. This means that when the key is held down, the character will be typed repetitively until the key is released.

The number of keys can range from 75 for the IBM 3278 Display Station to 122 on a 3270 Personal Computer keyboard. (The 124-key Japanese Katakana keyboard is an exception.)

Keyboards are available in a number of national languages. Displays with typewriter, data entry, data entry keypunch, or APL2 Text keyboard layouts may be mixed when attached to a 3174 controller, but the keyboard languages must be the same. Consult your IBM marketing representative for more information about national-language keyboard versions and character sets.

IBM Personal Computers

The IBM personal computers are a family of workstations that may be connected to a host computer or used for local, personal computing. The IBM personal computers that attach to the 3270 Information Display System are:

- 5560/50/40 Multiworkstations
- 6150 RT Personal Computer, all models with 3278/3279 Emulation Adapter
- 6151 RT Personal Computer, all models with 3278/3279 Emulation Adapter
- 8525 Personal System/2 Model 25 with 3278/3279 Emulation Adapter
- 8530 Personal System/2 Model 30 with 3278/3279 Emulation Adapter
- 8550 Personal System/2 Model 50 with 3270 connection
- 8560 Personal System/2 Model 60 with 3270 connection
- 8570 Personal System/2 Model 70 with 3270 connection
- 8580 Personal system/2 Model 80 with 3270 connection.

Optional System Components

There are several components of the 3174 subsystem that have not yet been introduced in this book. These components are separate products that may be coupled with the 3174 controller to increase its capabilities. The following sections introduce these components and discuss them generally.

3299 Terminal Multiplexer

In large or dispersed computer installations, the IBM 3299 Terminal Multiplexer acts as an intermediary between the IBM 3174 Establishment Controller and its terminals. The multiplexer enables terminals to be located a greater distance from their controller than in a system without multiplexers. It also eliminates the expense and planning involved in running individual coaxial cables from the controller to each terminal. Other advantages to using 3299 terminal multiplexers are:

- Only one cable is required to connect a controller and a 3299. Because each 3299 can attach a maximum of eight terminals, four 3299s can attach thirty two 3270 terminals to a controller.
- Terminals can be attached to the 3299 by cables from a distance as far as 1500 meters (4920 feet) away. This means that the terminals can be 3000 meters (9840 feet) from a controller, which is twice the distance allowed for directly cabled terminals.
- The 3299 can be attached to all 3174 Establishment Controller models.
- The 3299 Model 2 is a replacement for the Model 1 in installations using coaxial cable. In addition, the Model 2 is attached directly to the IBM Cabling System, eliminating the need for baluns at the 3299 ends of the cables.
- The 3299 Models 2 and 3 are attached to a controller using the IBM Cabling System without requiring a balun at the 3299 end of the cable. Baluns are not required at the 3174 end of the cable.

  Specified twisted-pair wire is used to attach the terminals to the Model 3. The terminals will usually require a coax-to-twisted-pair adapter for attachment to twisted-pair wire.

3814 Switching Management System

The IBM 3814 Switching Management System switches processor channels among I/O controllers in a data processing center. Its modular design allows individual 3814 units to be distributed through a large processing center to put switching capability where it is needed. The 3814 lets you switch resource pools among processors, back up failing processors and devices, and balance the workload among processors. This makes it easier for you to manage the resources in your data center. Using the 3814 you can:

- Rapidly configure your resources among the channels of one or more IBM System/370, 30xx, or 43xx processors
- Provide alternative paths to critical devices
- Increase the number of possible controller configurations on each channel.

These are some of the characteristics of the 3814:

- Allows remote control of switching (you can locate the switching console up to 305 meters [1000 feet] away from the 3814)
- Uses operator control on a 3178 or 3278 display terminal or a 3270 PC, or if the system attachment feature is installed, on a host-attached terminal
- Uses prestored configurations for rapid, error-free reconfigurations
- Switches immediately or synchronously with a lull in channel traffic
- Has an online help facility (USERINFO) that you can tailor for your own use
- Generates a log record file
- Prints to a 3287 printer
- Allows password security
- Has self-diagnostics.

5209 Link Protocol Converter

The IBM 5209 Link Protocol Converter enables terminals to communicate with a System 36, System 38 (S/36 or S/38), or AS/400 host or control unit in addition to a 3174 controller.

The 5209 attaches to the 3174 controller by the 3299 Terminal Multiplexer. This permits the 5209 to be located up to 1500 meters (4920 feet) from the 3174 controller and 1500 meters from the host or control unit. The terminals and printers can be located another 1500 meters from the host.

The 5209 can connect up to seven terminals and printers. The terminals can be switched between host sessions on the S/36, S/38, or AS/400 and the 370 host by processing a specific key sequence. Printers can be assigned to either host through configuration.

The 5209 provides the customer a means of using S/3x systems as a department computer while maintaining host applications on the 370. This eliminates dual terminals and printers and reduces the cabling impact.

The 5209 Link Protocol Converter supports these devices:

- 3178 Display Station Models C1, C2, and C3
- 3179 Color Display Station Model 1
- 3180 Display Station Model 1
- 3191 Display Station
- 3192 Display Station
- 3194 Display Station (CUT mode)
- 3278 Display Station Models 2, 3, 4, and 5
- 3279 Color Display Station Models S2A, 2A, 3A, 2X, 3X, S2B, S3G, 2B, and 3B
- IBM Personal Computer (CUT mode)
- IBM Personal Computer with 3278/79 Emulation Adapter
- 3262 Line Printer Models 3 and 13
- 3268 Printer Models 2 and 2C
- 3287 Printer Models 1, 1C, 2, and 2C
- 3812 Pageprinter
- 4214 Printer Model 1
- 4224 Printer
- 4234 Printer Model 1
- 4245 Printer
- 5210 Printer Models G01 and G02
- 6262 Line Printer.

Chapter 3. Models of the 3174 Establishment Controller

This chapter describes each model of 3174 Establishment Controller in detail. Functions and features supported by each controller are listed and discussed.

The controllers are categorized in three groups, according to the size cluster that they support. Clusters are explained in more detail in "Controllers and Terminals" on page 1-3.

Appendix A, "Quick-Reference Tables," contains a quick-reference chart that lists the features supported by each controller model.

Large-Cluster Controllers

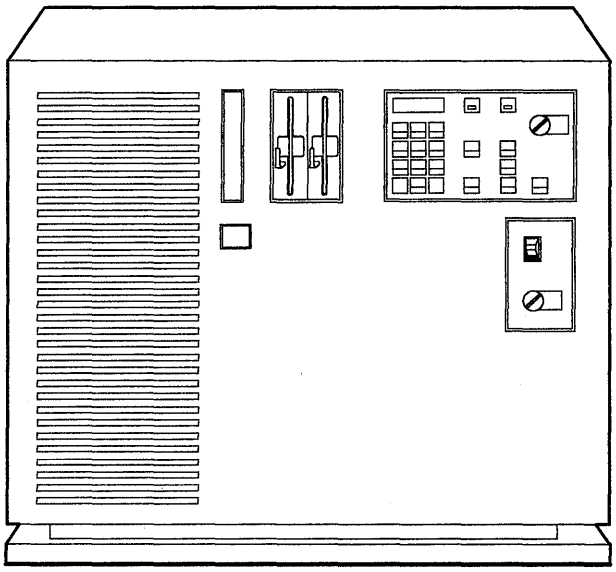

Figure 3-1. 3174 Controller Models 1L, 11L, 1R, 11R, 2R, 12R, 3R, and 13R

3174 Model 1L

The 3174 Model 1L (shown in Figure 3-1) large-cluster controller is shipped with an S/370-type channel adapter for local attachment and will work in an SNA or non-SNA environment. It has 1MB base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load (DSL) microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 1L supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. Tests and problem

determination can be performed without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel or through a control unit terminal attached to port 0 only.

The 3174 Model 1L supports several special features that can be installed by the customer. They are:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Type 3 Communication Adapter
Concurrent Communication Adapter (see note)
Terminal Multiplexer Adapter
Storage Expansion
Type 1 Communication Adapter
Type 2 Communication Adapter
Type 3A Communication Adapter.

Note: If you want to install the Concurrent Communication Adapter on this controller model, you must replace the 1.2MB diskette drive with a 2.4MB diskette drive or a fixed disk drive and have Configuration Support-B.

3174 Model 11L

The 3174 11L large-cluster controller is shipped with an S/370-type channel adapter for local attachment in an SNA or non-SNA environment. It has 2MB base storage and a 5-1/4-inch, high-capacity diskette drive. If this controller is shipped with Configuration Support-A or -S, Release 5, the diskette drive is 1.2MB. If the controller is shipped with Configuration Support-B, the drive is 2.4MB. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed.

A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer adapters supports a maximum of thirty two 3270 and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the Model 11L. This controller supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel or through a control unit terminal attached to port 0 only.

The 3174 11L supports several special features that can be installed by the customer. They are:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Concurrent Communication Adapter
Terminal Multiplexer Adapter
Storage Expansion
Type 1 Communication Adapter
Type 2 Communication Adapter
Type 3A Communication Adapter.

3174 Model 1R

The 3174 Model 1R is a large-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. The Model 1R has 1MB base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 1R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. Online tests and problem determination can be done without interrupting other terminals attached to the controller. Offline tests are performed through the 3174 control panel or through a control unit terminal attached to port 0 only.

Features that the customer can install on the Model 1R are:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Concurrent Communication Adapter (see note)
Terminal Multiplexer Adapter
Storage Expansion
Encrypt/Decrypt Adapter
Type 3 Communication Adapter
Type 3A Communication Adapter.

Note: If you want to install the Concurrent Communication Adapter on this controller model, you must replace the 1.2MB diskette drive with a 2.4MB diskette drive or a fixed disk and have Configuration Support-B.

3174 Model 11R

The 3174 Model 11R is a large-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. It has 2MB of base storage and one 5-1/4-inch, high-capacity diskette drive. If this controller is shipped with Configuration Support-A or -S, Release 5, the diskette drive is 1.2MB. If the controller is shipped with Configuration Support-B, the drive is 2.4MB. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed.

A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 11R controller supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. This can be done without

interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel or through a control unit terminal attached to port 0 only.

Features that the customer can install on a Model 11R are:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Terminal Multiplexer Adapter
Storage Expansion
Concurrent Communication Adapter
Type 3A Communication Adapter.

3174 Model 2R

The 3174 Model 2R is a large-cluster controller designed for remote operations. It contains a Type 2 Communication Adapter that provides an X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 1MB base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters (a special feature) supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 2R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. This can be done without interrupting other terminals that are attached to the 3174 controller. Offline tests are performed through the 3174 control panel.

The customer can install the following features on the Model 2R:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Concurrent Communication Adapter (see note)
Terminal Multiplexer Adapter
Storage Expansion
Encrypt/Decrypt Adapter
Type 3 Communication Adapter
Type 3A Communication Adapter.

Note: If you want to install the Concurrent Communication Adapter on this controller model, you must replace the 1.2MB diskette drive with a 2.4MB diskette drive or a fixed disk and have Configuration Support-B.

3174 Model 12R

The 3174 Model 12R is a large-cluster control unit designed for remote operations. It contains a Type 2 Communication Adapter that provides X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 2MB base storage and one 5-1/4-inch, high-capacity diskette drive. If this controller is shipped with Configuration Support-A or -S, Release 5, the diskette drive is 1.2MB. If the controller is shipped with Configuration Support-B, the drive is 2.4MB. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal

Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 12R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. This can be done without interrupting other terminals that are attached to the 3174 controller. Offline tests are performed through the 3174 control panel.

The customer can install certain features on this controller. They are:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Terminal Multiplexer Adapter
Storage Expansion
Concurrent Communication Adapter
Type 3A Communication Adapter.

3174 Model 3R

The 3174 Model 3R is designed to connect to an IBM Token-Ring Network. It contains a Type 3 Communication Adapter that provides the ability for the controller to operate on an IBM Token-Ring Network at 4Mbps. It has 1MB of base storage and one 5 1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 3R controller supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. This can be done without interrupting other terminals that are attached to the controller. Offline tests are performed through the 3174 control panel.

The customer can install the following features on this model:

Second diskette drive
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Encrypt/Decrypt Adapter
Single Link Multi-Host Support
Terminal Multiplexer Adapter
Storage Expansion
Type 1 Communication Adapter
Type 2 Communication Adapter
Type 3A Communication Adapter
Concurrent Communication Adapter (see note).

Note: If you want to install the Concurrent Communication Adapter on this controller model, you must replace the 1.2MB diskette drive with a 2.4MB diskette drive or a fixed disk and have Configuration Support-B.

3174 Model 13R

The 3174 Model 13R is designed to connect to an IBM Token-Ring Network. It contains a Type 3A Communication Adapter that provides the ability for the controller to operate on an IBM Token-Ring Network at either 16Mbps or 4Mbps. It has 2MB of base storage and one 5/1.4-inch, high-capacity diskette drive. If this controller is shipped with Configuration Support-A or -S, Release 5, the diskette drive is 1.2MB. If the controller is shipped with Configuration Support-B, the drive is 2.4MB. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A four-port terminal adapter that attaches IBM 3299 Terminal Multiplexers and Terminal Multiplexer Adapters supports a maximum of thirty two 3270 terminals and 24 ASCII terminals.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 13R controller supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer. This can be done without interrupting other terminals that are attached to the controller. Offline tests are performed through the 3174 control panel.

The customer can install the following features on this model:

Second diskette drive
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Single Link Multi-Host Support
Terminal Multiplexer Adapter
Storage Expansion
Type 1 Communication Adapter
Type 2 Communication Adapter
Concurrent Communication Adapter.

Medium-Cluster Controllers

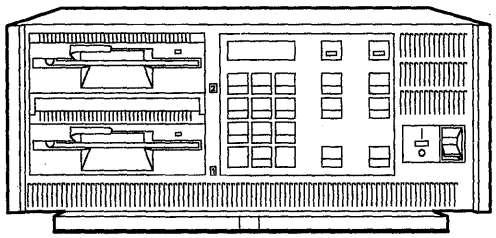

Figure 3-2. 3174 Controller Models 51R, 61R, 52R, 62R, 53R, and 63R

3174 Model 51R

The 3174 Model 51R (shown in Figure 3-2) is a medium-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. It has 1MB of base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 51R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features:

- Second diskette drive
- Token-Ring Network Gateway feature
- Asynchronous Emulation Adapter
- Type 3 Communication Adapter
- Storage Expansion
- 20MB Fixed Disk Drive
- Type 3A Communication Adapter
- Concurrent Communication Adapter (see note).

Note: If you want to install the Concurrent Communication Adapter on this controller model, you must replace the 1.2MB diskette drive with a 2.4MB diskette drive or a fixed disk and have Configuration Support-B.

3174 Model 61R

The 3174 Model 61R is a medium-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. It has 2MB of base storage and one 5-1/4-inch, 2.4MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals

directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 61R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
Type 3A Communication Adapter
Storage Expansion
20MB Fixed Disk Drive
Concurrent Communication Adapter.

3174 Model 52R

The 3174 Model 52R is a medium-cluster controller designed for remote operations. It contains a Type 2 Communication Adapter providing X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 512KB of base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 52R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features on the Model 52R:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
Type 3A Communication Adapter
20MB Fixed Disk Drive
Storage Expansion
Type 3 Communication Adapter.

Note: The Model 52R does not support Configuration Support-B because of storage limitations.

3174 Model 62R

The 3174 Model 62R is a medium-cluster controller designed for remote operations. It contains a Type 2 Communication Adapter providing X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 2MB of base storage and one 5-1/4-inch, 2.4MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 62R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features on the Model 62R:

Second diskette drive
Token-Ring Network Gateway feature
Asynchronous Emulation Adapter
Type 3A Communication Adapter
20MB Fixed Disk Drive
Storage Expansion
Concurrent Communication Adapter.

3174 Model 53R

The 3174 Model 53R connects to the IBM Token-Ring Network. It contains a Type 3 Communication Adapter that provides the ability for the controller to operate on an IBM Token-Ring at 4Mbps. The Model 53R has 1MB base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 53R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features on this model:

Second diskette drive
20MB Fixed Disk Drive
Storage Expansion
Single Link Multi-Host Support.

3174 Model 63R

The 3174 Model 63R connects to the IBM Token-Ring Network. It contains a Type 3A Communication Adapter that provides the ability for the controller to operate on an IBM Token-Ring Network at either 16Mbps or 4Mbps. When connected to a Model 63R, terminals can be located almost anywhere within an establishment and still operate at near channel response time.

The Model 63R has 2MB base storage and one 5-1/4-inch, 2.4MB, high-capacity diskette drive. If the controller has one diskette drive and uses devices that require downstream load microcode, a second diskette drive or fixed disk must be installed. A nine-port terminal adapter supports nine terminals directly or sixteen 3270 terminals and eight ASCII terminals through one or two IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 63R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The customer can install the following features on this model:

Second diskette drive
Storage Expansion
Asynchronous Emulation Adapter
20MB Fixed Disk Drive
Concurrent Communication Adapter
Single Link Multi-Host Support.

Small-Cluster Controllers

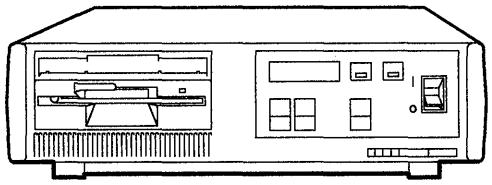

Figure 3-3. 3174 Establishment Controller Models 81R, 91R, 82R, and 92R

3174 Model 81R

The 3174 Model 81R (shown in Figure 3-3) is a small-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. It has 1MB of base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. A four-port terminal adapter supports four terminals directly or eight 3270 terminals through an IBM 3299 Terminal Multiplexer.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 81R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The 81R controller supports no customer-installable features.

3174 Model 91R

The 3174 Model 91R is a small-cluster controller designed for remote operations. It contains a Type 1 Communication Adapter that provides EIA 232D/CCITT V.24 and CCITT V.35 interfaces for SNA/SDLC, BSC, or X.25 remote link attachment. It has 2MB of base storage and one 5-1/4-inch, 2.4MB, high-capacity diskette drive. A four-port terminal adapter supports four terminals directly or eight 3270 terminals through an IBM 3299 Terminal Multiplexer.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The Model 91R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The 91R controller supports no customer-installable features.

3174 Model 82R

The 3174 Model 82R is a small-cluster controller designed for remote operations. It contains a Type 2 Communication Adapter that provides an X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 1MB of base storage and one 5-1/4-inch, 1.2MB, high-capacity diskette drive. A four-port terminal adapter supports four terminals directly or eight 3270 terminals through IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The 82R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

This model of the 3174 controller does not support any customer-installable features.

3174 Model 92R

The 3174 Model 92R is a small-cluster controller designed for remote operations. It contains a Type 2 Communication Adapter that provides an X.21 interface (CCITT V.11) for SNA/SDLC or X.25 remote link attachment. It has 2MB of base storage and one 5-1/4-inch, 2.4MB, high-capacity diskette drive. A four-port terminal adapter supports four terminals directly or eight 3270 terminals through IBM 3299 Terminal Multiplexers.

Customizing is performed with a control unit terminal attached to port 0 of the 3174. Any terminal can be attached to port 0 at other times. The 92R supports full keyboard utilities.

Subsystem online tests and problem determination are performed through a control unit terminal attached to any port or multiplexer without interrupting other terminals attached to the 3174. Offline tests are performed through the 3174 control panel.

The 3174 Model 92R does not support any customer-installable features.

Chapter 4. System Attachment

This chapter contains information about the controller-to-host end of the communications path.

Local Attachment

Locally, a controller is attached to a System/370-type processor through a selector, multiplexer, or block multiplexer channel. The controller is attached by cables to one of the controller positions on the host channel interface. From the host computer, the channel provides the controller with both the data for display and printing, and the control information it needs to direct the operation of its attached terminals. In their buffer storage, the terminals store the data from the controller for display or printing. Each display station's buffer permits simultaneous presentation of the display image and composition of a message from the keyboard.

Locally attached controllers can be positioned as far as 122 meters (400 feet) from the system channel, depending upon the system and channel configuration. Locally attached controllers are the models 1L and 11L. These models also attach to the IBM 3044 Fiber Optic Channel Extender Link, permitting the controllers to be placed up to 2 kilometers (6600 feet) from the channel.

Remote Attachment

Remotely, the controller and the system channel can communicate in two ways: (1) through a channel-attached communication controller or an integrated communication adapter using BSC protocol, or (2) through a communication controller using BSC or SDLC protocol. The controller communicates with intermediary devices by means of communication facilities (data links), such as:

- Modems
- Voice-grade channels
- Equivalent facilities such as telephone lines, microwaves, or satellites.

The following controllers can be remotely attached using BSC protocol:

- 3174 Models 1R, 11R, 51R, 61R, 81R, and 91R.

These controllers can be remotely attached using SDLC or X.25 protocols:

- 3174 Models 1R, 11R, 2R, 12R, 51R, 61R, 52R, 62R, 81R, 91R, 82R, and 92R.

Token-Ring Network Attachment

The controllers attached to an IBM Token-Ring Network can communicate with the host by means of a gateway feature that attaches the Token-Ring Network to the host. For the following controllers, this gateway may be an IBM 16/4Mbps Token-Ring Network Gateway feature:

- Models 1L, 11L, 1R, 11R, 2R, 12R, 51R, 61R, 52R, and 62R.

The following controllers attach the workstations to the IBM Token-Ring Network:

- Models 3R, 13R, 53R, and 63R.

Communication Networks and Modems

When using BSC protocol, the following controllers can attach to a multipoint nonswitched network:

- Models 1R, 11R, 51R, 61R, 81R, and 91R.

When using SDLC protocol, the following controllers can attach to a multipoint non-switched line network:

- Models 1R, 11R, 2R, 12R, 51R, 61R, 81R, 91R, 82R, and 92R.

The following can also attach to switched lines:

- Models 1R, 11R, 2R, 12R, 51R, 61R, 81R, 91R, 82R, and 92R.

When two or more SDLC devices are multidropped, messages can be simultaneously transmitted and received using duplex facilities (multi-multipoint operation). The 3174 controller can operate in data duplex mode.

Some of the external IBM modems that can be used in remote systems are:

Nonswitched Network Modems

- 3833 2400 bps
- 3834 4800 bps
- 3863 Model 1 2400 bps
- 3864 Model 1 4800 bps
- 3865 9600 bps
- 3868 Model 1 2400 bps
- 3868 Model 2 4800 bps
- 3868 Model 3 9600 bps
- 3868 Model 4 9600 bps
- 5811 2400, 4800, 9600, 19 200 bps (baseband)
- 5865 9600 bps
- 5866 14 400 bps
- 5868 9600 bps
- 5868 14 400 bps
- 5979 Model L41 2400, 4800, 9600, 19 200 bps (baseband).

Switched Network Modems

- 3863 Model 2 2400 bps
- 3864 Model 2 4800 bps.

Some of the external IBM modems that support switched network backup (SNBU) operation are:

- 3863, 3864, and 3865
- 5865 and 5866 (5866 exception is 3276).

A backup Control diskette configured for SNBU may be needed.

Switched network backup operation is initiated by the terminal operator. For example, when a problem is experienced with a nonswitched line, the operator can invoke SNBU by calling the host system via the public switched telephone network to reestablish a connection and resume operation.

The X.21 Interface permits SDLC operation at speeds of 2400, 4800, 9600 or 48 000 bps through X.21 switched and nonswitched data communication equipment.

The X.25 interface enables remote models to attach to host systems via an X.25 network, using SNA-defined protocols.

Chapter 5. Programming Support

Most of the 3174 Establishment Controller's programming support is provided by the 3270 Information System, of which the 3174 is a component. Programming support for the 3270 Information System is made up of access methods, operating systems, and licensed programs.

In this chapter, these software components are listed. Contact your IBM marketing representative for details.

Operating Systems

- Airlines Control Program (ACP)
- Disk Operating System/Virtual Storage Extended (DOS/VSE)
- Multiple Virtual Storage/Extended Architecture (MVS/XA)
- Multiple Virtual Storage/System Product (MVS/SP)
- Operating System/Virtual Storage 1 (OS/VS1)
- Small System Executive (SSX)
- Small System Executive/Virtual Storage Extended (VSE/SSE)
- Virtual Machine/System Product (VM/SP)

Telecommunication Access Methods

- Advanced Communications Function/Virtual Telecommunications Access Method (ACF/VTAM) under DOS/VS, DOS/VSE, and OS/VS
- Advanced Communications Function/Telecommunications Access Method (ACF/TCAM) under OS/VS
- Advanced Communications Function/Virtual Telecommunications Access Method Entry (ACF/VTAME) under DOS/VSE
- Basic Telecommunications Access Method (BTAM) under OS, DOS, OS/VS, and DOS/VS
- Basic Telecommunications Access Method — Extended Support (BTAM-ES) under DOS/VSE
- Extended Telecommunications Modules (EXTM) feature of CICS/DOS/VS
- Telecommunications Access Method (TCAM) under OS and OS/VS
- Virtual Telecommunications Access Method (VTAM) under DOS/VS and OS/VS

Note: If you use Configuration Support-B (Release 1), and any telecommunication access method involving VTAM, you may need an updated version of the VTAM product. Configuration Support-B provides for a new Token-Ring polling method that requires the latest VTAM level. See your IBM marketing representative for details.

Network Control

- Advanced Communications Function/Network Control Program (ACF/NCP)
- Emulation Program (EP)
- NetView
- NetView Distribution Manager (NetView DM)
- Network Design and Analysis (NETDA)
- Network Performance Analyzer (NPA)
- Network Performing Analysis Reporting System (NETPARS)
- Virtual Machine/VTAM Communications Network Application (VM/VCNA)
- VM/Pass-Through Facility

Note: If you have the NetView network management product, it requires that each terminal within the system be able to report data about itself. This is called reporting vital product data (VPD) and consists of self-identifying data about the terminal. Some CUT displays cannot do this. Configuration Support-A Release 5 and Configuration Support-S Release 5 provide microcode that enables these CUT displays to report VPD.

Cross-Industry Licensed Programs

- Financial Management System
- Instructional Systems (IIAS/IIPS)
- Interactive Financial System (IFS)
- Interactive Personnel System (INTERPERS)
- Planning, Control, and Decision Evaluation System (PLANCODE)
- Report Management and Distribution System (RMDS)
- Trend Analysis

Information Center

- A Departmental Reporting System II (ADRS II)
- APL Data Interface (APL/DI)
- APL Financial Planning System (APL/FPS)
- GRAPHPACK Full Screen Interface
- Query-by-Example (QBE)
- VS APL (A Programming Language)

Development Center

- Development Management System/CICS/VS (DMS/CICS/VS)
- Development Management System/Cross System Product (DMS/CSP)
- Entry Level Interactive Application System (ELIAS)
- IMS Application Development Facility II (IMSADF II)
- Screen Definition Facility/Customer Information Control System (SDF/CICS)

Office Systems

- Advanced Text Management System III (ATMS III)
- Document Composition Facility (DCF)
- Host Display View Facility (HDVF)
- Integrated Processing of Data and Text (IPDT)
- Professional Office System (PROFS)
- Storage Information Retrieval System (STAIRS)

Database Data Communication Systems

- Customer Information Control System/Data Check (CICS/DC)
- CICS/DC Aids
  - CICS/VS Online Test/Debug II (OLTD II)
  - CICS Source Program Maintenance Online II (SPM II)
- CICS/VS
- Database/DC (DB/DC) Data Dictionary
- IMS/VS Aids
  - Batch Terminal Simulator
- Information Management System/VS Data Communications (IMS/VS-DC)

Interactive Programming Support

- Conversation Monitor System (CMS)
- Interactive System Productivity Facility (ISPF)
- Time Sharing Option (TSO)
- TSO Extensions (TSO/E)
- Virtual Storage Extended/Interactive Computing and Control Facility (VSE/ICCF)
- Virtual Storage Personal Computing (VSPC)

Other Licensed Programs

- Communication Oriented Production Information Control System (COPICS)
- Display console support for local 3270 displays and printers used as operator's consoles through Device-Independent Display Operator Console Support (DIDOCS) and Status Display Support OS and OS/VS
- Distributed Processing Control Executive (DPCX)
- Distributed Processing Programming Executive (DPPX)
- Downstream Load Utility (DSLU)
- Editor (XEDIT)
- Graphical Data Display Manager (GDDM)
- 3270-PC Graphics Applications System
- Time Sharing Option (TSO) of TCAM and VTAM
- 3-Dimensional Presentation Graphics Facility (3D-PGF)
- 3270 Personal Computer File Transfer Program
- IBM PC/HOST File Transfer and Terminal Emulator Program

Appendix A. Quick-Reference Tables

This appendix contains three sections, each of which contains one or more tables. These tables provide a means of quickly referencing information about the 3174 controller. Tables in the first section contain information about the devices that attach to the controller. The second section contains a table that lists the features supported by each model of the controller. The third section contains a table that shows the possible alternate configurations that each controller supports.

Several of the tables contain acronyms and abbreviations. Table keys and explanatory notes follow these tables. For more information about devices that attach to the 3174, see your IBM marketing representative.

Table of 3174 Controller Devices

This section contains lists of devices that the 3174 Establishment Controller supports. The lists are shown in tables according to device type.

Table A-1 (Page 1 of 2). Display Devices Supported by 3174 Controller

Name	Model	Additional Information
3101	see note 4	ASCII
3151	all models	ASCII
3161	all models	ASCII
3162	all models	ASCII
3163	all models	ASCII
3164	all models	ASCII
3178	all models	CUT
3179	model 1	CUT
3179	models G1, G2	DFT (see note 1)
3180	model 1	CUT
3191	all models	CUT
3192	models C, D, F, L, W	CUT
3192	model G	DFT (see note 1)
3193	all models	DFT (see note 1)
3194	all models	DFT
3278	all models	CUT
3279	all models	CUT
3290	all models	DFT (see note 1)
5371	all models	DFT
5373	all models	DFT
5540	see note 4	DFT

Table A-1 (Page 2 of 2). Display Devices Supported by 3174 Controller		
Name	**Model**	**Additional Information**
5550	see note 4	DFT
5560	see note 4	DFT
5578	see note 4	DFT
6150	all models	CUT
6151	all models	CUT
SOEMI	see note 4	CUT

Notes:

1. These display models are not supported on models 81R, 91R, 82R, and 92R.
2. ASCII display models require the Asynchronous Emulation Adapter (AEA).
3. Abbreviations that are used in this table are explained in the key that follows the last device table.
4. See your IBM marketing representative for specific model information about this device.

Table A-2. Printer Devices Supported by 3174 Controller		
Name	**Model**	**Additional Information**
3262	models 3, 13	3270
3268	models 2, 2C	3270
3287	models 1, 1C, 2, 2C	3270
3812	model 2	3270
3852	model 02	ASCII
4201	model 2	ASCII
4202	see note 3	ASCII
4207	see note 3	ASCII
4208	see note 3	ASCII
4214	model 1	ASCII
4224	models 2C2, 2E2, 201, 202	3270
4234	model 1	3270
4245	models D12, D20	3270
4250	model 1	3270
5201	model R2T2	ASCII
5202	model R2T2	ASCII
5204	see note 3	ASCII
5210	model G1, G2	3270
5216	see note 3	ASCII
5218	see note 3	ASCII
5223	see note 3	ASCII
5227	model 11	3270
6262	model D12, D14	3270

Notes:

1. ASCII printer models require the Asynchronous Emulation Adapter (AEA).
2. Abbreviations that are used in this table are explained in the key that follows the last device table.
3. See your IBM marketing representative for specific model information about this device.

Table A-3. Other Devices Supported by 3174 Controller		
Name	**Model**	**Additional Information**
3814	model AX	Switching Mgmt System
5150	all models	PC w/3270 Emulator
5160	all models	PC XT w/3270 Emulator
5162	model 286	PC XT w/3270 Emulator
5170	see note 2	Personal Computer AT w/3270 Emulator
5170	see note 2	Personal Computer AT/370
5271	all models	3270 PC
5273	all models	3270 Personal Computer AT
5371	all models	3270 PC/G, GX
5373	all models	3270 PC AT/G, AT/GX
5531	all models	Industrial PC
6150	all models	RT Personal Computer
6151	all models	RT Personal Computer
5578	see note 2	workstation
7531	see note 2	Indust. w/3270 Emulator
7532	see note 2	Indust. w/3270 Emulator
7552	all models	Industrial PC
8525	all models	PS/2 Model 25 w/3270 Emulator
8530	model 021	PS/2 Model 30 w/3270 Emulator
8550	model 021	PS/2 Model 50 w/3270 Emulator
8560	model 041, 071	PS/2 Model 60 w/3270 Emulator
8580	all models	PS/2 Model 80 w/3270 Emulator
OEM	see note 2	Original Equipment Manufacturer

Notes:

1. Abbreviations that are used in this table are explained in the key that follows the last device table.
2. See your IBM marketing representative for specific model information about this device.

Abbreviation	Meaning
ASCII	American National Standard Code for Information Interchange
CUT	Control unit terminal
DFT	Distributed function terminal
PC	Personal Computer
PS/2	Personal System/2
SOEMI	Serial Original Equipment Manufacture Interface

Note About Keyboards:
The keyboard models supported by the 3270 Information Display System are too numerous to list here. For information about specific keyboard models, refer to *3174 Establishment Controller Character Set Reference*.

Table of Features Supported by Each 3174 Controller

The table below shows the features that each model of the 3174 Establishment Controller supports.

Features	3174 Models																	
	1L	1R	2R	3R	11L	11R	12R	13R	51R	52R	53R	61R	62R	63R	81R	82R	91R	92R
Central Site Customizing	B	B	B	B	B	B	B	B	B	B	B	B	B	B	X	X	X	X
Storage Expansion	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X
CSCM (see note 1)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20MB Fixed Disk Drive	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X
Multiple Log. Terminals (see note 1)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
CECP	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
IPDS	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Token-Ring Network Gateway	O	O	O	X	O	O	O	X	O	O	X	O	O	X	X	X	X	X
AEA	O	O	O	O	O	O	O	O	O	O	X	O	O	O	X	X	X	X
2.4MB Diskette Drive (see note 3)	O	O	O	O	B	B	B	B	O	O	O	B	B	B	X	X	B	B
Type 1 Communication Adapter	O	B	X	O	O	B	X	O	B	X	X	B	X	X	B	X	B	X
Type 2 Communication Adapter	O	X	B	O	O	X	B	O	X	B	X	X	B	X	X	B	X	B
4Mbps Type 3 Communication Adapter	O	O	O	B	X	X	X	X	O	O	B	X	X	X	X	X	X	X
2MB Base Storage	X	X	X	X	B	B	B	B	X	X	X	B	B	B	X	X	B	B
Encrypt/ Decrypt Adapter	X	O	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Type 3A Communication Adapter	O	O	O	O	O	O	O	B	O	O	O	O	O	B	X	X	X	X
Concurrent Comm. Adapter	O	O	O	O	O	O	O	O	O	X	X	O	O	O	X	X	X	X
Single Link Multi-Host Support	X	X	X	O	X	X	X	O	X	X	O	X	X	O	X	X	X	X
Terminal Mult. Adapter	O	O	O	O	O	O	O	O	X	X	X	X	X	X	X	X	X	X

Abbreviation	Meaning
B	Base feature
O	Optional feature
X	Not supported on this model of the 3174 controller

Notes:

1. Additional memory may be required with this feature.
2. Some of the features listed in this table are also known by numbers. For information about feature numbers, see your IBM marketing representative.
3. On Models 11L, 11R, 12R, and 13R, the 2.4MB diskette drive is a base feature only if these controllers are shipped with Configuration Support-B; if they are shipped with Configuration Support-A or -S, Release 5, the diskette drive is 1.2MB.

Table of Alternate Controller 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*.

Alternate configurations provide the following advantages:

- Controller flexibility
- Increased communication capabilities
- Backup communications.

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

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 A-4. Alternate Configurations. These alternate configurations are for models that can contain, in addition to their primary communication adapter, a Type 1, Type 2, or Type 3 communication 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

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.

ACP. Airlines Control Program.

ADRS II. A Departmental Reporting System II.

AEA. Asynchronous Emulation Adapter.

ANSI. American National Standards Institute.

APA. All points addressable.

APL. A Programming Language.

ASCII. American National Standard Code for Information Interchange.

ATMS II. Advanced Text Management System.

B

bps. Bits per second.

BSC. Binary synchronous communication.

BTAM. Basic Telecommunications Access Method.

C

CCA. Concurrent Communication Adapter

CCITT. International Telegraph and Telephone Consultative Committee.

CECP. Country extended code page.

CICS. Customer Information Control System.

coax. Coaxial (cable).

COPICS. Communication Oriented Product Information Control System.

CSCM. Central site change management.

CSP. Cross System Product.

CSCU. Central Site Change Utility.

CSU. Customer setup.

CUT. Control unit terminal.

D

DCF. Document Composition Facility.

DEMF. Display Exception Monitoring Facility.

DFT. Distributed function terminal.

DI. Data Interface.

DIDOCS. Device-Independent Display Operator Console Support.

DM. (1) Distribution Manager. (2) Display Manager.

DMS. Development Management System.

DOS. Disk Operating System.

DPPX. Distributed Processing Programming Executive.

DSL.. Downstream load.

E

EBCDIC. Extended binary-coded decimal interchange code.

EIA. Electronic Industries Association.

ELIAS. Entry Level Interactive Application System.

EP. Emulation Program.

ES. Extended Support.

F

FERS. Facility Error Recognition System.

FPS. Financial Planning System.

G

GDDM. Graphical Data Display Manager.

H

HDVF. Host Display View Facility.

I

IFS. Interactive Financial System.

IML. Initial microcode load.

IMSADF II. IMS Application Development Facility II.

INTERPERS. Interactive Personnel System.

IPDT. Integrated Processing of Data and Text.

I/O. Input/output.

IPDS. Intelligent Printer Data Stream.

L

LU. Logical unit.

M

Mb. Megabit.

MB. Megabyte; 1 048 576 bytes.

MLT. Multiple Logical Terminals.

MVS. Multiple Virtual Storage.

N

NCP. Network Control Program.

NEMF. Network Error Management Facility.

NETPARS. Network Performing Analysis Reporting System.

NPA. Network Performance Analyzer.

O

OEM. Original equipment manufacturer.

P

PA. Program access.

PC. Personal Computer.

PD. Problem determination.

PLANCODE. Planning, Control, and Decision Evaluation System.

PROFS. Professional Office System.

PU. Physical unit.

Q

QBE. Query By Example.

R

RMDS. Report Management and Distribution System.

RPQ. Request for price quotation.

RTM. Response Time Monitor.

S

SDF. Screen Definition Facility.

SDLC. Synchronous Data Link Control.

SNA. Systems Network Architecture.

SNBU. Switched network backup.

SOEMI. Serial Original Equipment Manufacturer Interface.

SP. System product.

SPM. Source Program Maintenance.

SSX. Small System Executive.

STAIRS. Storage Information Retrieval System.

T

TCAM. Telecommunications Access Method.

TSO. Time Sharing Option.

V

VCNA. VTAM Communications Network Application.

VM. Virtual machine.

VS. Virtual Storage.

VSE. Virtual Storage Extended.

VSPC. Virtual Storage Personal Computing.

VTAM. Virtual Telecommunications Access Method.

W

WCC. Write control character.

X

XA. Extended architecture.

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 3174 Establishment Controller.

A

access method. A technique for moving data between main storage and input/output devices.

adapter. A general term for a device that provides some transitional function between two or more devices.

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.

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.

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.

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.

balun. A transformer for connected balanced (for instance, twisted pair) cables to unbalanced (for instance, coaxial) cable by matching the electrical characteristics of the cables.

binary synchronous communication (BSC). Data transmission in which character synchronism is controlled by timing signals generated at the sending and receiving stations.

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.

Central site change management (CSCM). A function of the 3174 microcode that tracks the microcode for each controller in a network and, in conjunction with NetView DM, electronically distributes and retrieves microcode changes for each controller.

central site customizing. The process of tailoring controller microcode for each controller in a network, at the central site.

central site library. One or more Library disks that contain customizing data and label information for the controllers in a network.

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-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 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.

cluster. A station that consists of a 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*. Synonymous with *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.

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.*

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.*

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.*

control character. (1) A character whose occurrence in a particular context specifies a control function. (2) A character used to specify that a controller is to perform a particular operation.

Control disk. A customized diskette or fixed disk containing the microcode that describes a particular controller's attached terminals, and its method of attachment to the host.

Control (CTL) diskette. A customized diskette containing the microcode that describes a particular controller's attached terminals, and its method of attachment to the host.

controller. A unit that controls input/output operations for one or more devices.

control unit. A general term for any device that provides common functions for other devices or mechanisms.

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.

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 controller, and store the customizing data for that library member on a Library diskette.

customization. Procedures that tailor the controller microcode to fit the various types of display stations and printers and the method of host attachment that a particular controller will handle.

D

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*.

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.

decrypt. To convert encrypted data into clear data. Contrast with *encrypt*.

device. A mechanical, electrical, or electronic contrivance with a specific purpose.

direct access storage device. (1) A storage device that provides direct access to data. (2) See also *immediate access storage* and *random access memory*.

disk. A direct-access data storage medium, which may be either flexible (diskette) or hard (fixed disk).

diskette. A flexible magnetic disk enclosed in a protective container.

diskette drive. The mechanism used to seek, read, and write data on diskettes.

display field. (1) An area in the display buffer that contains a set of characters that can be manipulated or operated upon as a unit. (2) A group of consecutive characters (in the buffer) that starts with an attribute character (defining the characteristics of the field) and contains one or more alphanumeric characters. The field continues to, but does not include, the next attribute character.

display station. An input/output device containing a display screen and an attached keyboard that allows a user to send information to or receive information from the system.

distributed function terminal (DFT). A programmable terminal that can perform operations previously performed by the controller. 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 controller to which it is attached. A diskette containing the terminal's control program is loaded into the controller.

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.

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*.

extended binary-coded decimal interchange code (EBCDIC). A coded character set of 256 eight-bit characters.

F

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.

full duplex. Synonym for *duplex*.

G

gateway. (1) A functional unit that connects two computer networks of different network architectures.

generate. In 3174 central site customizing, to write a Control diskette containing the customizing data for a particular controller. Also, to print a mailing address label and a diskette label for a particular controller.

H

host application program. An application program processed in the host computer.

host attachment. A mode of SNA communication in which the processor acts as a secondary SNA device.

host computer. (1) In a computer network, a computer that provides end users with services such as computation and data bases and that usually performs network control functions. (2) The primary or controlling computer in a multiple-computer installation. (3) A computer used to prepare programs for use on another computer or on another data processing system; for example, a computer used to compile link edit, or test programs to be used on another system. (4) Synonym for *host processor*.

host logical unit (LU). An SNA logical unit (LU) located in a host processor, for example, an ACF/VTAM application program.

host processor. (1) A processor that controls all or part of a user application network. (2) In a network, the processing unit in which resides the access method for the network. (3) In an SNA network, the processing unit that contains a system services control point (SSCP). (4) A processing unit that executes the access method for attached communication controllers. (5) The processing unit required to create and maintain PSS. (6) Synonymous with *host computer*.

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

IBM Cabling System. A permanently installed wiring system that eliminates the need to rewire when terminals are moved from one location to another within an office complex. It allows transmission of data at very high speeds and is the foundation for installing a local area network.

immediate access storage. A storage device whose access time is negligible in comparison with other operating times.

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.

L

leased line. Synonym for *nonswitched line*.

link. The logical connection between nodes including the end-to-end link control procedures.

local. Pertaining to a device accessed directly without use of a telecommunication line. Synonym for *channel-attached*. Contrast with *remote*.

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.

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.

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

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.

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*.

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.

original equipment manufacturer (OEM). A manufacturer of equipment that may be marketed by another manufacturer.

P

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.

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.

R

random access memory (RAM). A storage device into which data is entered and from which data is retrieved in a nonsequential manner. See also *direct access storage*.

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 controller provides.

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.

S

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*.

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.

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*.

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)*.

system configuration. A process that specifies the devices and programs that form a particular data processing system.

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*.

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.

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.

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

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.

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 (UTL) diskette. A diskette 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.

W

workstation. An input/output device that allows transmission of data or reception of data as needed to perform a job.

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.

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.

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Introduction

Publication No. GA27-3850-0

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