IBM

# 3174 Establishment Controller

## Site Planning

3270 Information Display System

# 3174 Establishment Controller

## Site Planning

The following warning statements (required by country regulatory agencies) are applicable in the countries indicated.

**United States**

**Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.**

**Additional IBM Statement**

This warning is also applicable to all attaching units produced for use in the U.S.A. that have been manufactured after December 31, 1980. A notice of compliance has been affixed within the customer access area of all affected units.

**Instructions to User:**

Properly shielded and grounded cables and connectors must be used for connection to peripherals in order to meet FCC emission limits. Proper cables are available through IBM marketing channels, or from dealers of computer accessories. IBM is not responsible for any radio or television interference caused by using other than recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

**United Kingdom**

**Warning: This IBM product is made to high Safety standards. It complies inherently with Telecommunications safety standard BS6301. It is not designed to provide protection from excessive voltages appearing externally at its interfaces. Therefore, when this product is connected to a public telecommunications network via any other equipment, and you connect to this product items not supplied by IBM United Kingdom Ltd., you must comply with mandatory telecommunications safety requirements.**

**You may do this either by choosing products which also are approved as complying to BS6301 or British Telecom Technical Guide No. 26, or by the use of approved safety barriers. Consult the local office of your public telecommunications operator, for advice and permission to make the connections.**

**Canadian Department of Communications compliance statement**

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

**Avis de conformité aux normes du ministère des Communications du Canada**

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

# Choosing the Right Book from the 3174 Library

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

**To Organize Library Materials:**

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

**To Become Familiar with the 3174:**

*Master Index*, GC30-3515
*3174 Introduction*, GA27-3850
*3270 Information Display System Introduction*, GA27-2739

**To Prepare Your Site for the 3174:**

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

**To Set Up and Operate the 3174:**

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

**To Plan for and Customize the 3174:**

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

**To Install Features or Convert Models on the 3174:**

*Encrypt/Decrypt Adapter Installation and Removal Instructions*, GA23-0262
*Fixed Disk Installation and Removal Instructions*, GA27-3864
*Diskette Drive Installation and Removal Instructions*, GA23-0263
*Terminal Multiplexer Adapter Installation and Removal Instructions*, GA23-0265
*Model Conversion Instructions*, GA23-0295
*Token-Ring Network Feature Installation and Removal Instructions*, GA23-0329
*Storage Expansion Feature Installation and Removal Instructions*, GA23-0330
*Communications Adapter Installation and Removal Instructions*, GA27-3830
*Asynchronous Emulation Adapter Installation and Removal Instructions*, GA23-0341

**To Plan for and Use the Asynchronous Emulation Adapter Feature:**

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

**To Use the Multiple Logical Terminals Function:**

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

**To Perform Problem Determination:**

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

**To Obtain Data Stream Programming and Reference Information:**

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

**To Perform Maintenance (Service Personnel):**

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

**To Find Translations of Safety Notices:**

*Safety Notices*, GA27-3824

**v**

## Additional Publications

Some other manuals that may be required for installing and planning for attachments to the 3174 Establishment Controller are:

### From the IBM 3270 Information Display System Library:

*3174 Subsystem Control Unit Planning and Utilities Guide*, GA23-0214
*IBM 3299 Terminal Multiplexer Product Information*, G520-4216.

### From other sources:

*IBM Multiuse Communications Loop Planning and Installation Guide*, GA27-3341
*Guide to Multiuse Communication Loop with IBM Cabling System*, GA27-3606
*IBM Cabling System Planning and Installation Guide*, GA27-3361
*IBM Cabling System Catalog*, G570-2040
*A Building Planning Guide for Communication Wiring*, G320-8059
*Using the IBM Cabling System with Communication Products*, GA27-3620
*IBM Token-Ring Network Telephone Twisted-Pair Media Guide*, GA27-3714
*Installation and Assembly of Coaxial Cable and Accessories*, GA27-2805
*IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*, GA27-3722
*IBM 3044 Fiber-Optic Channel Extender Link: Fiber-Optic Cable Planning and Installation Guide*, GC22-7073
*IBM System/360 and IBM System/370 I/O Interface Channel to Control Unit Original Equipment Manufacturer's Information*, GA22-6974
*IBM General Information Manual Installation Manual — Physical Planning*, GC22-7072
*IBM Token-Ring Network Introduction and Planning Guide*, GA27-3677.

The 3174 *Customer Setup and Relocation Instructions* and the *Planning and Utilities* are generally used after the overall site planning sequence has been developed with this manual.  You should arrange to obtain all description and site planning manuals for terminals that attach to the 3174 Establishment Controller in the same time period that you use this book.

# Preface

This book identifies the tasks involved in preparing for the installation of the IBM 3174 Establishment Controller and provides guidelines for setting up and organizing the tasks.

## Who Should Read This Book

The *Site Planning* book is for anyone who plans for the installation of the IBM 3174 Establishment Controller and ensures that the site is ready for hardware installation. This book provides information for anyone who gives direction to and works with people at individual sites where the hardware is to be installed, who has a full-time job as a site planner, or who performs site planning as a part of his or her job.

## How to Use This Book

If you are using this book for the first time, read Chapter 1, "Introduction" before you begin site planning. Chapter 1 contains the Site Planning Checklist and an overview of site planning for the 3174 Establishment Controller.

You should complete three types of forms as you plan your site:

* Site Planning Checklist
* Site Floor Planning Worksheet
* 3174 cabling worksheets.

## How This Book Is Organized

This book is organized into the following chapters and appendixes:

Chapter 1, "Introduction," contains a suggested checklist for site planning and discusses customer and IBM responsibilities in the site planning task.

Chapter 2, "Subsystem Configurations," contains detailed information about subsystem configurations.

Chapter 3, "Planning Subsystem Cabling," contains detailed information about subsystem cabling.

Chapter 4, "Planning for Unit Placement and Terminal Cable Installation," describes how to define your subsystem, complete the cabling worksheets, and attach terminal and communication cables.

Chapter 5, "Machine Specifications," contains specifications for the 3174 Establishment Controllers and the 3299 Terminal Multiplexers.

Chapter 6, "Environmental and Safety Planning," contains information about environmental planning.

Appendix A, "United States and Canada Power Plug Types," gives specifications for power plug types for the United States and Canada.

Appendix B, "World Trade Power Plug Types," shows specifications for World Trade power plug types.

Appendix C, "Inch-to-Millimeter Conversion Table," lists inch-to-millimeter unit conversions.

Appendix D, "Voltage Limitations," provides voltage limitations.

Appendix E, "Acoustical Data," contains acoustical data.

Appendix F, "Products That Support Direct Attachment of the 3174," contains information about direct-connection attachment.

Appendix G, "3174 Cabling Worksheets," contains the 3174 cabling worksheets.

Appendix H, "3174 Cabling Instructions," contains 3174 cabling instructions and part numbers for cables used with the 3174.

# Summary of Changes

## Fifth Edition (December 1988)

Information has been changed or added:

- To reflect the name change from 3174 Subsystem Control Unit to 3174 Establishment Controller

- To describe 3174 Establishment Controller Models 11L, 11R, 12R, 13R, 61R, 62R, 63R, 91R, and 92R

- To describe the Concurrent Communication Adapter.

# Contents

# Tables

# Figures

# Chapter 1. Introduction

This chapter describes the site planning task and some possible IBM 3174 Establishment Controller configurations. (In this book, the IBM 3174 Establishment Controller is referred to as the 3174. The 3174 and the devices attached to it are referred to as the 3174 subsystem.) It also provides a site planning checklist to help you make sure that all site planning tasks are completed.

Installation of the 3174 may involve three different tasks:

- Installing a new 3174 subsystem or expanding an existing subsystem
- Relocating a 3174 subsystem
- Replacing and removing existing controllers.

You need to plan each task before you begin. Figures 1-1 through 1-4 show examples of a 3174 subsystem.

## Possible Configurations

Site planning includes preparing the building and equipment area to receive the 3174, terminals, and cables. The following list describes possible configurations:

- Models 1L and 11L can be attached to a host system through a local channel.

- Models 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, and 62R with the IBM Token-Ring Network 3270 Gateway feature can be attached to a Token-Ring Network.

- Models 1R, 2R, 11R, and 12R can be attached to a host system through a communication network. Models 3R, 13R, 53R, and 63R can be attached to a host through an IBM Token-Ring Network. Figure 1-2 on page 1-4 shows an example of a 3174 with a Token-Ring Network.

- A maximum of 32 terminals can be attached to a Model 1L, 1R, 2R, 3R, 11L, 11R, 12R, or 13R through 3299 Terminal Multiplexers or Terminal Multiplexer Adapters (TMAs). Up to 24 ASCII terminals, modems, or hosts can be attached if the Asynchronous Emulation Adapter (AEA) feature is installed. Figure 1-3 on page 1-5 shows a 3174 subsystem with the AEA feature.

- Models 51R, 52R, 61R, and 62R can be attached to a host system through a communication network. Models 53R and 63R can be attached to a host system through an IBM Token-Ring Network. If the AEA feature is also installed (except in Model 53R), up to eight ASCII terminals, modems, or hosts can be attached directly or through modems.

- A maximum of 16 3270-type terminals can be attached to Models 51R, 52R, 53R, 61R, 62R, and 63R through two 3299s, or one 3299 and eight direct terminal attachment ports.

- Models 81R, 82R, 91R, and 92R can be attached to a host system through a communication network.

- A maximum of eight terminals can be attached to Models 81R, 82R, 91R, and 92R through one 3299. Without a 3299, a maximum of four terminals can be attached directly.

- Models 1L, 1R, 2R, 3R, 11L, 12R, 13R, 61R, and 62R can be attached to one host through the primary host interface and two secondary hosts through Concurrent Communication Adapters. Models 51R and 63R can be attached to one host through the primary host interface and one secondary host through a Concurrent Communication Adapter.
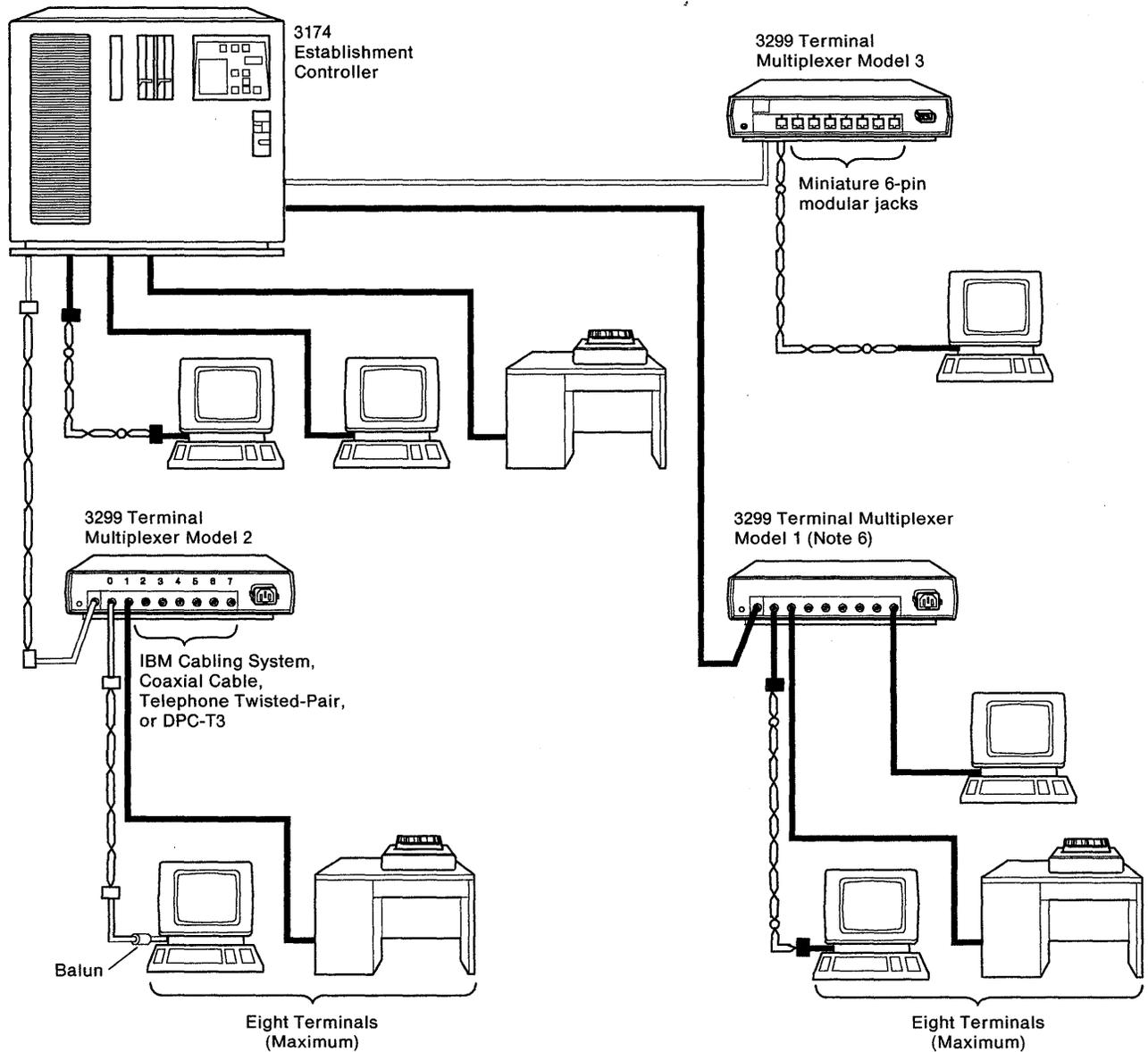
**Legend:**

| | |
|---|---|
| ▬▬▬▬▬▬▬▬ | Coaxial Cable (Note 1) |
| ⊂◯◯◯◯◯◯◯▷ | IBM Cabling System Types 1, 2, and 9 (Note 2) |
| ⊂◯◯◯◯◯◯◯▷ | IBM Cabling System Telephone Twisted-Pair Wire (Type 3 Media) (Note 4) |
| ═══════ | IBM Cabling System, Coaxial Cable, or Telephone Twisted-Pair Wire (Notes 2 and 5) |
| ▬▬■◁× | 3270 Coax-to-Twisted-Pair Adapter (Notes 3 and 4) |
| ▬▬◁× | DPC-T3 Connector (Note 7) |

1   Maximum cable length is approximately 1500 m (4920 ft).
2   Refer to *IBM Cabling System Planning and Installation Guide.*
3   Refer to *IBM/ROLM 3270 Coax-to-Twisted Pair Adapter Planning and Installation Guide.*
4   Refer to the *Telephone Twisted-Pair Media Guide.*
5   Installation of twisted pair media is not recommended when there are high levels of electrical interference. Consult your IBM representative.
6   The 3299 Model 1 is no longer manufactured.
7   See "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

Figure   1-1.  An Example of a 3174 Subsystem
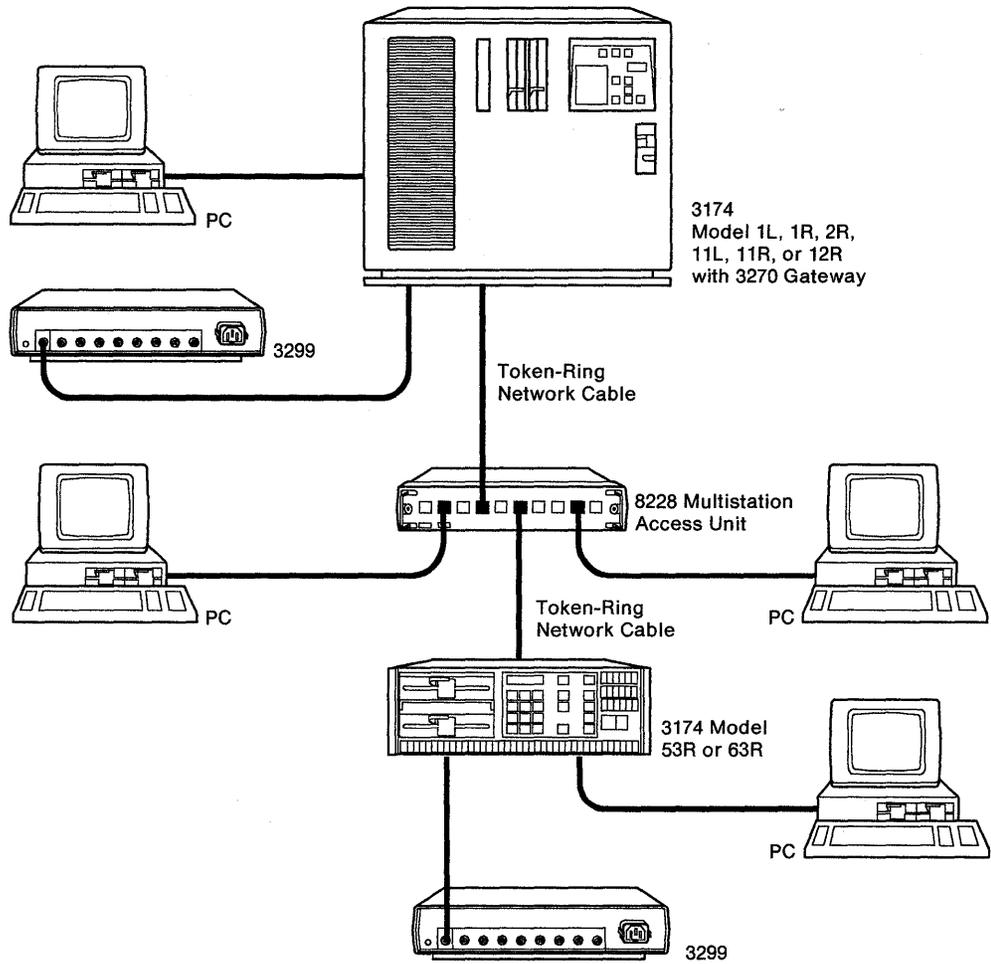
Figure   1-2.  An Example of a 3174 Subsystem with a Token-Ring Network
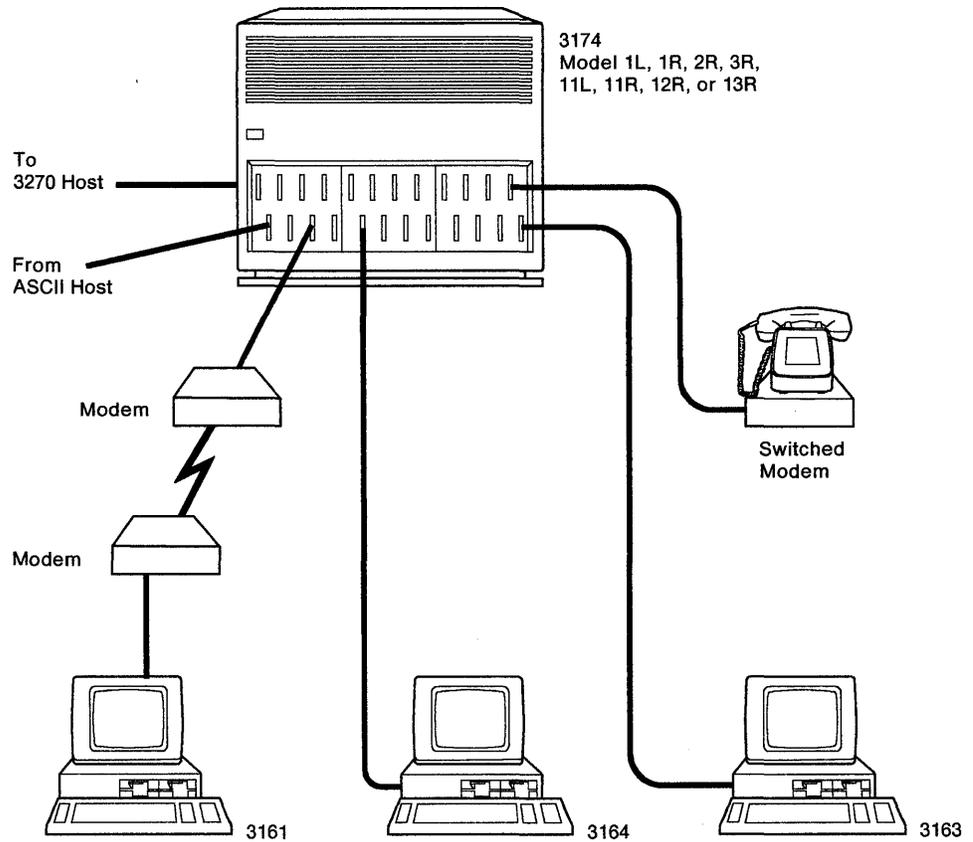
Figure    1-3.  An Example of a 3174 Subsystem with the AEA Feature
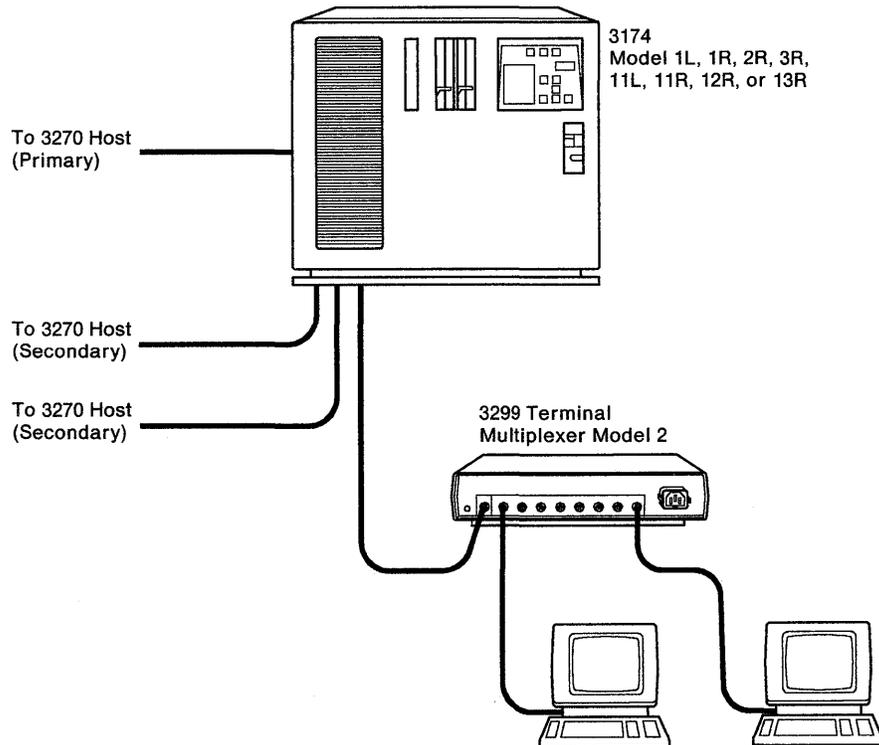


Figure    1-4.  An Example of a 3174 Subsystem with the CCA Feature

# Customer Responsibilities

Your responsibilities in site planning and preparation include the following:

* Working with the IBM representative for site planning.

* Completing the planning checklist and applicable worksheets.

* Developing a floor plan to show the location of equipment and building facilities, as well as cable lengths.

* Providing and maintaining properly wired power receptacles.

* Procuring, installing, and maintaining customer-supplied cables (such as coaxial cables, AEA cables, and Type 3 telephone cables) and the IBM Cabling System.

    **Note:** Planning and installing the IBM Cabling System could take six months and should be planned accordingly.

* Installing the 3270 Coax-to-Twisted-Pair Adapter (CTPA) or 3270 Dual Purpose Connector to Twisted-Pair (DPC-T3) Adapter.

* Arranging for installation of any communication facilities (common carrier, Postal Telephone and Telegraph [PTT], or private) and attaching IBM communication cables to these facilities.

* Comparing the Customer Order with the Customer Contents List.

* Performing the customer setup (CSU) and checkout of devices that are designated as CSU units.

# Task Overview

Planning for a site configuration encompasses many tasks. The major tasks are:

1. Checking the environment.

    Before you install the IBM equipment that you have ordered, check to see that your building meets all the environmental requirements for each machine. See Chapter 5, "Machine Specifications," and Chapter 6, "Environmental and Safety Planning," for specific environmental requirements.

2. Ordering the controllers and terminals for your configuration.

    If you are responsible for ordering the controllers, terminal multiplexers, and terminals for your site, see your IBM representative for help in obtaining and completing the order form. If someone else in your company orders the controllers, terminal multiplexers, and terminals, make sure that person gives you a copy of the order form.

3. Defining your subsystem configuration.

    Decide where you want to place the controllers, terminal multiplexers, and terminals that you have ordered. See Chapter 3, "Planning Subsystem Cabling," and Chapter 4, "Planning for Unit Placement and Terminal Cable Installation," for more information about planning your subsystem configuration.

4. Designing your site floor plan.

    The Site Floor Planning Worksheet is in Chapter 4, "Planning for Unit Placement and Terminal Cable Installation." Included in Chapter 4 is one

example each of a 3174 Model 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R configuration, a 3174 Model 51R, 52R, 53R, 61R, 62R, and 63R configuration, and a 3174 Model 81R, 82R, 91R, and 92R configuration. See Chapter 5, "Machine Specifications," for machine specifications. Appendix C lists inch-to-millimeter conversions, which you may need to complete the Site Floor Planning Worksheet.

5. Determining the subsystem cabling.

   Chapter 3, "Planning Subsystem Cabling," and Chapter 4, "Planning for Unit Placement and Terminal Cable Installation," contain information about cable types and cabling considerations. Additional information about cables can be found in Chapter 5, "Machine Specifications."

6. Completing the 3174 cabling worksheets.

   Instructions on how to complete the 3174 cabling worksheets are given in Chapter 4, "Planning for Unit Placement and Terminal Cable Installation." The worksheets are in Appendix G. Work with the customizing planner to fill out the worksheets appropriate to your configuration.

7. Giving the completed worksheets to your setup personnel.

   Give a copy of the completed 3174 Site Floor Planning Worksheet, 3174 cabling worksheets, and 3174 cabling instructions to your setup personnel. You should also make sure that they have a copy of the order form so the setup personnel can ensure that the ordered equipment has arrived.

## Completing the Site Planning Checklist

The Site Planning Checklist is a suggested checklist for a new installation. Your 3174 subsystem may not require all the steps indicated, or it may require additional steps. Modify the checklist to meet your subsystem requirements, but be sure you have enough time to complete all the steps before your 3174 arrives.

Note that the amount of time before delivery of your machine will vary. Your 3174 may arrive as early as a few weeks after ordering, or it may take longer.

Additional checklists for items pertaining to installing a 3174 with the AEA or CCA features or adding these features to an existing 3174 follows the Site Planning Checklist.

| Step | Schedule Date | Customer | IBM | Date Completed | Event |
|------|---------------|----------|-----|----------------|-------|
| 1 | | x | | | Designate a person in your organization who will be responsible for all phases of the 3174 installation. |
| 2 | | x | x | | Review this planning checklist with the person designated above. |
| 3 | | x | | | Evaluate the environmental conditions at the desired installation site to ensure that adequate physical space, power supplies, etc., are available. |
| 4 | | x | | | Decide who will install (1) the terminal cables between the 3174 and 3299 and the attached terminals, (2) the power receptacles, wiring, etc. (your maintenance personnel or a contractor), (3) the IBM Cabling System, and (4) the telephone twisted-pair wire. |
| 5 | | x | | | Identify and schedule data communication needs. Identify the source for communication line (contact telephone company). Order modems as required. |
| 6 | | x | x | | Determine the schedule dates with the IBM representative. Fill in the dates on this form and give a copy to the IBM representative. |
| 7 | | x | | | Lay out the floor plan. Show the locations of control units, terminal multiplexers, terminals, modems, and storage areas. |
| 8 | | x | x | | Determine whether changes to the existing data processing units (host system computer transmission control units) are needed. If so, schedule the required changes. |
| 9 | | x | x | | Review the overall installation plan with the IBM representative. |
| 10 | | x | | | Order supplies. |
| 11 | | x | | | Place an order for cables from IBM or a contractor, or order the materials to make the cables yourself.[1] Also order required 3299s at this time. |
| 12 | | x | | | Arrange for the installation of (1) the terminal cables between the 3174 and 3299 and the attached terminals, (2) the power receptacles, wiring, etc., (3) the IBM Cabling System, and (4) telephone lines. |
| 13 | | x | | | Define a training program for employees. |
| 14 | | x | | | Order the required terminal manuals. |
| 15 | | x | | | Review the progress of the data communication plan. Identify and resolve any schedule conflicts. |
| 16 | | x | x | | Review the 3174 configuration to make sure the configuration meets your needs. Make any necessary changes to your cable order. |
| 17 | | x | x | | Review the installation plan to confirm your schedule. |
| 18 | | x | x | | Confirm the arrival of cables. |

---

[1] Existing 3274 channel and sequencing cables can be used with the 3174. See "Replacing a 3274 with a 3174" on page 3-22 for more details.

| Step | Schedule Date | Customer | IBM | Date Completed | Event |
|---|---|---|---|---|---|
| 19 | | x | | | Begin installing and labeling cables and power receptacles. |
| 20 | | x | | | Begin employee training. |
| 21 | | x | | | Complete the installation and testing of cables and power receptacles. |
| 22 | | x | | | Install communication facilities (telephone line and modems). |
| 23 | | x | | | Complete the required changes to the existing programs and data processing units. |
| 24 | | x | | | Complete the site preparation. |
| 25 | | x | | | Make sure all the necessary information is available for the setup personnel (switch settings, configuration information, customizing worksheets, etc.). |
| 26 | | x | | | Review the setup instructions with the setup personnel. |
| 27 | | x | | | Move the units to their locations and unpack them, using the unpacking instructions. |
| 28 | | x | | | Complete the setup of the 3174 using the setup instructions included in the shipping cartons. |
| 29 | | x | | | Complete 3174 customizing. |
| 30 | | x | x | | Attach 3174 Model 1L or 11L to the channel. |

The additional checklist for the AEA follows.

| Step | Schedule Date | Customer | IBM | Date Completed | Event |
|---|---|---|---|---|---|
| 1 | | x | | | Confirm the arrival of the customer-supplied cables for connecting to the AEA. |
| 2 | | x | | | Install limited-distance modems and wiring. |
| 3 | | x | | | Install additional modems and wiring needed for an AEA. A mounting rack may be needed if a large number of modems will be installed. |
| 4 | | x | | | Review the Site Planning Checklist to ensure that the steps for a normal installation of a 3174 have been completed. |
| 5 | | x | | | Verify terminal setup parameters (refer to *Terminal User's Reference for Expanded Functions*). |
| 6 | | x | | | Prepare and distribute end user documentation, such as keyboard maps and connection and diagnostic procedures. |

The additional checklist for the CCA follows.

| Step | Schedule Date | Customer | IBM | Date Completed | Event |
|------|---------------|----------|-----|----------------|-------|
| 1 | | x | | | Identify and schedule data communication needs. Identify the source for communication line (contact telephone company). Order modems as required. |
| 2 | | x | | | Lay out the floor plan. Show the locations of controllers, terminal multiplexers, terminals, modems, and storage areas. |
| 3 | | x | | | Install communications facilities (telephone line and modems). |

# Chapter 2. Subsystem Configurations

This chapter describes the different types of configurations for the 3174. You can attach the 3174 to a host using a local connection or a remote connection. You can also attach the 3174 to an ASCII host.

## Locally Attached Units

Local (channel) attachment (Figure 2-1 on page 2-2) of a 3174 Establishment Controller to a host system is through the IBM System 370 Input/Output (I/O) interface, as described in *IBM System/360 and IBM System/370 Input/Output Interface Channel to Control Unit Original Equipment Manufacturer's Information.*

The 3174, using SNA or non-SNA, can be attached to processors, such as the AS400, S/38, 308x, 3090, 4361, 4381, and 9370. A 3174 Model 1L or 11L with the IBM Token-Ring Network 3270 Gateway feature installed is compatible with SNA only. A 3174 Model 1L or 11L using the Serial Original Equipment Manufacturer (OEM) interface is compatible with non-SNA protocol.

The 3174 does not require channel service to be synchronized with its operation and, therefore, is not subject to overrun. It continues to wait for channel service.

Models 1L and 11L have two priority settings: high and low. The priority is set to high at the plant of manufacture, but you can request that your IBM representative change the priority to low. You should select the priority that will produce the greatest channel efficiency with the terminals attached to your 3174. The person in charge of your system or your IBM representative can help you decide on the priority setting for your configuration.
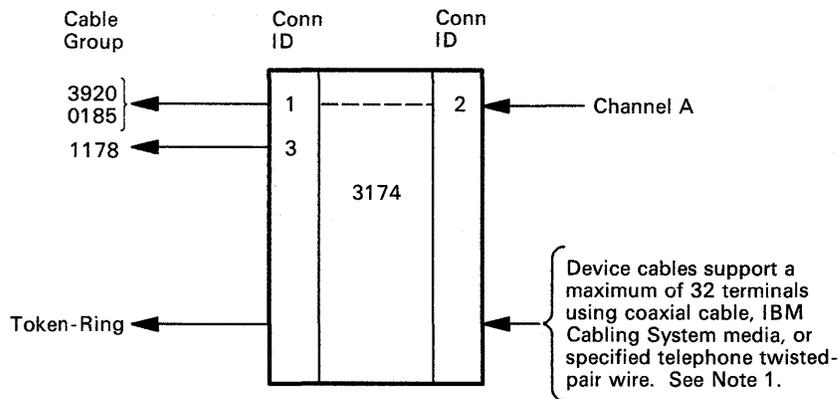
Cable Group | Conn ID | Conn ID

3920
0185 | 1 | 2 — Channel A
1178 | 3

3174

Token-Ring

Device cables support a maximum of 32 terminals using coaxial cable, IBM Cabling System media, or specified telephone twisted-pair wire. See Note 1.

**Notes:**

1. Device cables are supplied, installed, and maintained by the customer. For additional information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

   a. For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories*.

   b. For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide*.

   c. For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

   d. For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

2. Total cable length of 122 m (400 ft) is available to attach all 3174s, unless modified by cabling schematics of individual processing units or 3174s. Refer to *IBM System/370 Installation Manual – Physical Planning* or *IBM System/370 World Trade Installation Manual – Physical Planning* for specific channel cabling information. Using the IBM 3044 Fiber Optic Channel Extender Link can extend the distance between the 3174 and the processor up to 2 km (6600 ft).

3. Existing 3274 channel and sequence control cables can be used, if you have them. See "Replacing a 3274 with a 3174" on page 3-22.

4. The Group Number 0185 cable is a reduced-diameter channel cable.

5. For cabling to the 8228 Multistation Access Unit, refer to the *IBM Token-Ring Network Introduction and Planning Guide*.

Figure   2-1.  Models 1L and 11L Cabling Schematic

# Remotely Attached Units

You can attach a 3174 Establishment Controller to a host system through an integrated communication adapter or through an IBM Token-Ring Network communicating through a gateway. A 3174 attached with this configuration is *remotely* attached.

Figures 2-2 through 2-4 show the cabling for a 3174 directly attached to terminals. Figures 2-5 through 2-7 show the cabling for a 3299 Terminal Multiplexer.

The major elements of each data communication link between remotely located sites are:

- Modems or data circuit-terminating equipment (DCE)
- A communication channel
- A Token-Ring Network.

A communication channel is usually supplied by a common carrier or, in World Trade countries, by the Postal Telephone and Telegraph (PTT). A channel consists of wire, radio waves, or both. At each site, the common carrier provides the connector that terminates the channel.

A modem is installed at each end of each communication channel. The modem is the interface between the communication channel and the data terminal equipment (DTE).

**Note:** A switched network attachment to some OEM equipment requires the use of a protective device. You may have to order this from an OEM equipment supplier and install it separately.

Models 3R, 13R, 53R, and 63R can be connected to a Token-Ring Network for communication to an SNA host. Communication to the host is through a gateway that can be a 3174 Model 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, or 62R with the IBM Token-Ring Network 3270 Gateway feature.

Arrange for installation of communication equipment and services before the IBM equipment is scheduled to be installed.

```
        Conn          Conn
        ID            ID
                  ┌─────┬─────┬─────┐
◄────────────────┤  1  │     │     │
 Communication   │     │     │     │
 Cable           │     │     │     │
                 │     │3174 │     │
                 │     │     │     │
                 │     │     │     │◄──── Device cables support a
                 │     │     │     │      maximum of 32 terminals
◄────────────────┤     │     │     │      using coaxial cable,
 Token-Ring      └─────┴─────┴─────┘      IBM Cabling System media,
                                          or the 3270 Coax-to-
                                          Twisted-Pair Adapter.
                                          See Note 1.
```

**Notes:**

1. Device cables are supplied, installed, and maintained by the customer. For additional information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

   a. For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories*.

   b. For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide*.

   c. For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

   d. For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

2. See "Attaching Other 3174 Communication Cables" on page 4-40, for cable descriptions.

3. For cabling to the 8228 Multistation Access Unit, refer to the *IBM Token-Ring Network Introduction and Planning Guide*.

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



```
        Conn          Conn
        ID            ID
                  ┌─────┬─────┬─────┐
◄────────────────┤  1  │     │     │
 Communication   │     │     │     │
 Cable           │     │     │     │
                 │     │3174 │     │
                 │     │     │     │◄──── Device cables support a
                 │     │     │     │      maximum of 16 terminals
                 │     │     │     │      using coaxial cable,
◄────────────────┤     │     │     │      IBM Cabling System media,
 Token-Ring      └─────┴─────┴─────┘      or the 3270 Coax-to-
                                          Twisted-Pair Adapter.
                                          See Note 1.
```

**Notes:**

1. Device cables are supplied, installed, and maintained by the customer. For additional information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

   a. For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories*.

   b. For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide*.

   c. For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

   d. For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

2. See "Attaching Other 3174 Communication Cables" on page 4-40, for cable descriptions.

3. For cabling to the 8228 Multistation Access Unit, refer to the *IBM Token-Ring Network Introduction and Planning Guide*.

Figure  2-3. Models 51R, 52R, 53R, 61R, 62R, and 63R Cabling Schematic

Conn            Conn
                    ID              ID

    ◄──────────── 1

    Communication
    Cable                3174
                                        Device cables support a
                                        maximum of eight terminals
                                     ◄─ (by means of a 3299) using
                                        coaxial cable, IBM Cabling
                                        System media, or the 3270
                                        Coax-to-Twisted-Pair Adapter.
                                        See Note 1.

**Notes:**

1. Device cables are supplied, installed, and maintained by the customer. For additional information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

   a. For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories*.

   b. For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide*.

   c. For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

   d. For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

2. See "Attaching Other 3174 Communication Cables" on page 4-40, for cable descriptions.

Figure   2-4.  Models 81R, 82R, 91R, and 92R Cabling Schematic
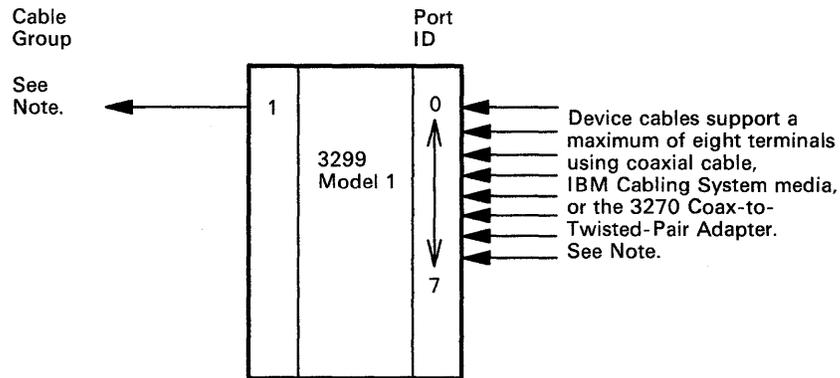
    Cable                        Port
    Group                        ID

    See
    Note.   ◄──────── 1          0  ◄──────
                                    ◄────── Device cables support a
                      3299          ◄────── maximum of eight terminals
                      Model 1       ◄────── using coaxial cable,
                                    ◄────── IBM Cabling System media,
                                    ◄────── or the 3270 Coax-to-
                                    ◄────── Twisted-Pair Adapter.
                                 7  ◄────── See Note.

**Note:**  Device cables are supplied, installed, and maintained by the customer. For additional information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

   a. For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories*.

   b. For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide*.

   c. For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

   d. For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual Purpose Connector to Twisted Pair Adapter" on page 3-6.

   e. The 3299 Terminal Multiplexer Model 1 is no longer manufactured.

Figure   2-5.  3299 Terminal Multiplexer Model 1 Cabling Schematic
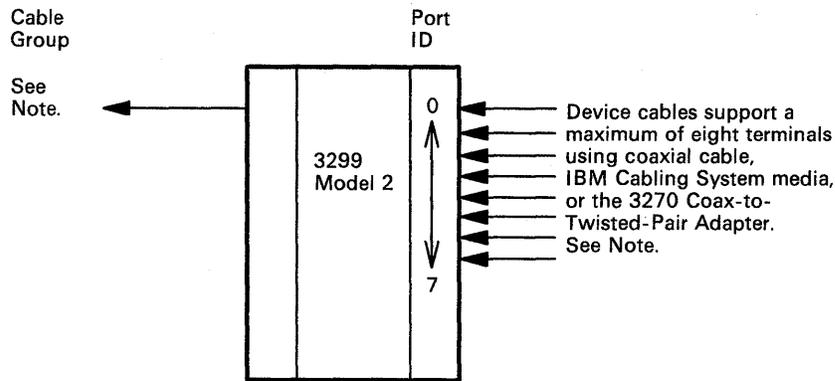
Cable                                    Port
Group                                    ID

See
Note.    ◄───────────                      0    ◄───── Device cables support a
                     ┌──────────┐               ◄───── maximum of eight terminals
                     │          │          ↑    ◄───── using coaxial cable,
                     │  3299    │          │    ◄───── IBM Cabling System media,
                     │  Model 2 │          │    ◄───── or the 3270 Coax-to-
                     │          │          ↓    ◄───── Twisted-Pair Adapter.
                     │          │               ◄───── See Note.
                     │          │          7    ◄─────
                     └──────────┘

**Note:**  Device cables are supplied, installed, and maintained by the customer. For additional
information about device cables, see Chapter 3, "Planning Subsystem Cabling," and the
following manuals:

   a.  For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories.*

   b.  For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation
       Guide.*

   c.  For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair
       Adapter Planning and Installation Guide.*

   d.  For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual
       Purpose Connector to Twisted Pair Adapter" on page 3-6.

Figure   2-6.  3299 Terminal Multiplexer Model 2 Cabling Schematic
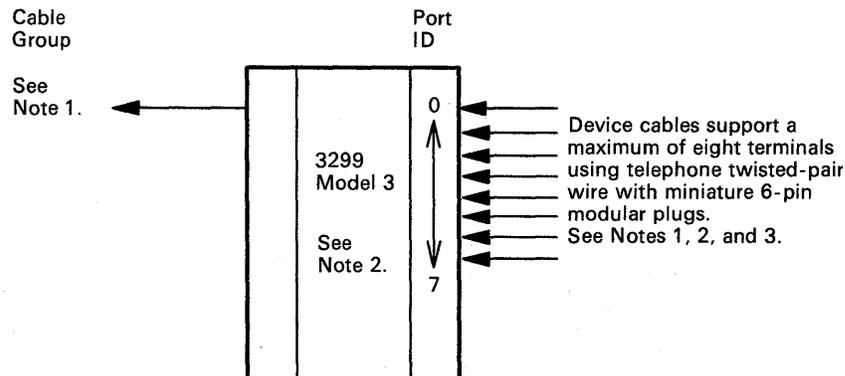
Cable                                    Port
Group                                    ID

See
Note 1.  ◄───────────                      0    ◄─────
                     ┌──────────┐               ◄───── Device cables support a
                     │          │          ↑    ◄───── maximum of eight terminals
                     │  3299    │          │    ◄───── using telephone twisted-pair
                     │  Model 3 │          │    ◄───── wire with miniature 6-pin
                     │          │          ↓    ◄───── modular plugs.
                     │  See     │               ◄───── See Notes 1, 2, and 3.
                     │  Note 2. │          7    ◄─────
                     └──────────┘

**Notes:**

1.  Device cables are supplied, installed, and maintained by the customer. For additional information
    about device cables, see Chapter 3, "Planning Subsystem Cabling," and the following manuals:

    a.  For coaxial cable, refer to *Installation and Assembly of Coaxial Cable and Accessories.*

    b.  For IBM Cabling System media, refer to *IBM Cabling System Planning and Installation Guide.*

    c.  For the 3270 Coax-to-Twisted-Pair Adapter, refer to *IBM/ROLM 3270 Coax-to-Twisted-Pair
        Adapter Planning and Installation Guide.*

    d.  For telephone twisted-pair wire, refer to *Telephone Twisted-Pair Media Guide.*

    e.  For the Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter, see "IBM 3270 Dual
        Purpose Connector to Twisted Pair Adapter" on page 3-6.

2.  The 3299 Model 3 is available only in U. S. and Canada.

3.  IBM supplies eight 7.6-m (25-ft) cables fitted with miniature 6-pin modular plugs **wired to pins 2 and
    5** on both ends.

Figure   2-7.  3299 Terminal Multiplexer Model 3 Cabling Schematic

Figure 2-8 summarizes the different types of cabling configurations that can be used from a 3174 directly to terminals or through a 3299 Terminal Multiplexer to terminals.
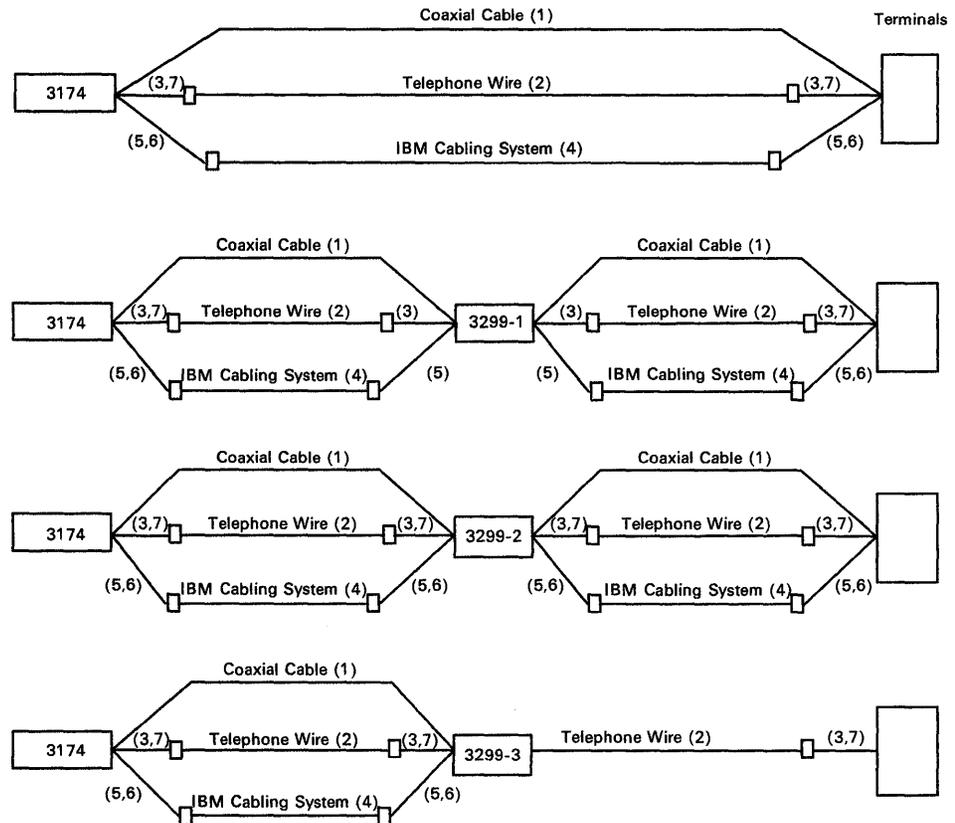


Figure 2-8. Summary of Cable Configurations

| Table 2-1. Summary of Cable Configurations | | |
|---|---|---|
| **Ref.** | **Description** | **Cable Length** |
| 1 | Coaxial cable | 1500 m (4920 ft) max |
| 2 | Specified telephone twisted-pair wiring | 30.5 m (100 ft) min<br>275 m (900 ft) max |
| 3 | IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter | 5.5 m (18 ft) |
| 4 | IBM Cabling System | With 0 baluns — 1524 m (5000 ft)<br>With 1 balun — 914 m (3000 ft)<br>With 2 baluns — 609 m (2000 ft) |
| 5 | Coaxial Balun Assembly<br>or Cableless Coaxial Balun | 2.4 m (8 ft)<br>4.9 m (16 ft) |
| 6 | Dual-Purpose Connector (DPC)<br>Attachment Cable (for use only with DPC jack) | 2.4 m (8 ft)<br>or 9 m (30 ft) |
| 7 | DPC-T3 Connector (for use only with DPC jack) | 4.5 m (15 ft) |

## Units Attached to ASCII Hosts or ASCII Terminals

The AEA is an optional feature in Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 51R, 52R, 61R, 62R, and 63R. Three AEAs can be installed in Models 1L, 1R, 2R, 3R, 11L, 12R, and 13R. Only one AEA may be installed in Models 51R, 52R, 61R, 62R, or 63R.

The AEA makes it possible to attach the 3174 Establishment Controller to an ASCII host or to ASCII terminals. The 3174 can be attached directly to the host, or it can be remotely attached through modems.

The major elements of each data communication link between remotely located sites are:

- Modems or DCE
- Direct cabling.

Arrange for the installation of communication equipment and services before the IBM equipment is scheduled to be installed.

A modem is installed at each end of each communication channel. The modem is the interface between the communication channel and the data terminal equipment (DTE). For more information about modems used with ASCII terminals and hosts, refer to the *IBM 3174 Establishment Controller Planning Guide.* If a large number of modems are used, you may find it useful to install them in a rack.

For distances of 15 m (50 ft) or less, you can connect the ASCII terminals or ASCII hosts directly to the AEA connectors without going through a modem. For distances greater that 15 m, use limited distance modems and wiring.

See Chapter 3, "Planning Subsystem Cabling," for cable fabrication procedures.

## Units Attached to Hosts through the Concurrent Communication Adapter

The Concurrent Communication Adapter CCA) is an optional feature in Models 1L, 1R, 2R, 3R, 11L, 11R 12R, 13R, 51R, 61R, 62R, and 63R. You can install two adapters in each of these models except Models 51R and 63R. In Models 51R and 63R, you can install one CCA.

Each Concurrent Communication Adapter allows you to attach the 3174 to one additional 3270 host. You can attach the host directly to the Concurrent Communication Adapter, or you can attach the host remotely through a modem.

The major elements of each data communication link between remotely located sites are:

- Modems or other DCE
- Direct cabling.

Arrange for the installation of communication equipment and services before the IBM equipment is scheduled to be installed.

A modem is installed at each end of each communication channel. The modem is the interface between the communication channel and the DTE.

# Chapter 3. Planning Subsystem Cabling

This chapter describes the cabling represented in Figures 2-1 through 2-7. It also provides basic information on coaxial cable installation, specifications for cables and connectors if you decide to make these cables, and IBM part numbers if you decide to purchase cables from IBM. Additional details about cabling are in the manuals listed in the "Related Publications" section of the preface.

## Maximum Distances of Cable Installation

Cabling for the system includes communication cables, power cables, and signal cables. IBM supplies some of these cables; you are responsible for supplying others, either by fabricating them or by purchasing them, preassembled, from IBM or from another source. A *preassembled* cable is one that is cut to the specified length with the connectors installed.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices.*).

All signal cabling should be separated from electrical equipment and wiring. Be sure to provide adequate spacing for the functional operation of the 3174 subsystem.

**Note:** It is your responsibility to ensure adequate separation in compliance with local and national codes.

The distances described in this section provide guidelines for voltages up to 440 V.

The minimum distances between shielded signal cable and unshielded power lines or electrical equipment are as follows:

| | |
|---|---|
| 2 kVA or below | 127 mm (5 in) |
| 2 – 5 kVA | 305 mm (12 in) |
| Over 5 kVA | 610 mm (24 in) |

The minimum distances between shielded signal cable enclosed in a grounded metallic conduit and unshielded power lines or electrical equipment are as follows:

| | |
|---|---|
| 2 kVA or below | 63 mm (2.5 in) |
| 2 – 5 kVA | 152 mm (6 in) |
| Over 5 kVA | 305 mm (12 in) |

The minimum distances between shielded signal cable and power lines enclosed in a grounded metallic conduit are as follows:

| | |
|---|---|
| 2 kVA or below | 63 mm (2.5 in) |
| 2 – 5 kVA | 152 mm (6 in) |
| Over 5 kVA | 305 mm (12 in) |

The minimum distances between shielded signal cable enclosed in a grounded metallic conduit and power lines enclosed in a grounded metallic conduit are as follows:

| | |
|---|---|
| 2 kVA or below | 30 mm (1.2 in) |
| 2 – 5 kVA | 76 mm (3 in) |
| Over 5 kVA | 152 mm (6 in) |

The minimum distance between shielded signal cable and fluorescent, neon, or incandescent lighting or dimmer control (SCR) fixtures is 127 mm (5 in).

Shielded signal cable may be routed adjacent to single-phase circuit-wiring lighting circuits (120 V) for distances up to 150 m (500 ft).

Additional details about cable separation for coaxial cable are in the books listed in the "Related Publications" section of the preface. You can request assistance for higher voltages or for unusual conditions can be requested from your IBM representative.

# Different Types of Cables

Cables are classified, in general, as *power* or *signal* cables. Power cables, also known as *power cords*, connect the 3174 to the AC power source. All remaining cables connected to the 3174 are signal cables.

Signal cables have specific names that indicate their function or the terminals to which they connect. Signal cables that connect to the 3174 are classified as follows:

- *Channel cables* connect the local models (Model 1L or 11L) of the 3174 to the host channel interface.

- *Communication cables* connect remote 3174 models (Models 1R, 2R, 11R, 12R, 51R, 52R, 61R, 62R, 81R, 82R, 91R, and 92R) to the modem or to the communication network.

- *Terminal cables* connect both local and remote models of the 3174 to 3270 display stations and printers.

- *AEA* cables connect ASCII terminals, ASCII hosts, or modems to the AEA connectors.

You can order channel and sequencing control cables from IBM. IBM supplies and ships communication cables with the 3174. The IBM Cabling System is available from authorized distributors. Contact your IBM representative for details. You are responsible for supplying terminal cables. Figures 2-1 through 2-7 identify the IBM cables by cable group number and part number; customer-supplied coaxial cables are identified by the letter designations *h*, *h-h*, and *l*. You can also purchase these cables from IBM.

## Channel Cables

Order channel cables at the same time you order the 3174 Model 1L or 11L. Cable group 0185 should be specified when ordering channel cables. You can use cable group 3920 when replacing a 3274 with a 3174. You must specify the length of the cables needed. See *IBM Installation Manual — Physical Planning General Information*, for cable length computation.

Your IBM representative will install the channel cables and power sequence and control cables after you have completed the initial setup.

Power sequencing is an option on most IBM equipment. You do not need to order power sequence and control cables unless you want to turn the equipment on or off from a single location or the individual machine requires it for other reasons. See the machine specifications in Chapter 5, Machine Specifications for specific requirements.

If you have a Model 1L or 11L and are unable to attach power sequencing cables, you can install the Emergency Power On accessory. This accessory (B/M 8575445) provides a jumper cable that turns on the 3174 when power is available.

## Communication Cables

The communication cable that connects the remote 3174 to the remote modem/DCE is shipped with the 3174. Specify communication cables at the same time you order the 3174.

IBM Token-Ring Network cables connect Models 3R, 13R, 53R, and 63R to the IBM Token-Ring Network. The IBM Token-Ring Network cable is shipped with Models 3R, 13R, 53R, and 63R and with the IBM Token-Ring Network 3270 Gateway feature for attachment to Model 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, or 62R.

**Note:** If you are replacing an IBM 3274 Control Unit with a 3174 Establishment Controller, do not use the existing 3274 cable to connect the 3174 to the modem/DCE; use the new cable. See "Replacing a 3274 with a 3174" on page 3-22 for details about the cables.

## Terminal Cables

Terminal cables can be any of the following:

- Coaxial cables
- IBM Cabling System type 1, 2, and 9 media
- 3270 Coax-to-Twisted-Pair Adapter
- Type 3 media (twisted-pair cables)
- 3270 Dual Purpose Connector to Twisted Pair (DPC-T3) Adapter.

You should install terminal cables before the 3174 terminals are delivered to your site. Your personnel (or a contractor) will connect these cables to the 3174 and to the attached terminals. Chapter 4, "Planning for Unit Placement and Terminal Cable Installation" describes how to prepare for and connect terminal cables.

## Coaxial Cables

IBM part numbers for coaxial cables are provided in *Installation and Assembly of Coaxial Cable and Accessories*. You can order these cables and associated cable connectors from IBM using a Miscellaneous Equipment Specification (MES) form. The group numbers and maximum lengths are listed in Table 3-1. You have the option of fabricating the coaxial cables yourself.

| Table 3-1. Summary of IBM Group Numbers for Coaxial Cable | | |
|---|---|---|
| **Group Number** | **Number of Cables** | **Maximum Length** |
| *h* (for indoor use)<br>*h-h* (for installation in plenums)<br>or *I* (for indoor and outdoor use) | 1 | 1500 m (4920 ft) |

**Note:** You are responsible for supplying, installing, and maintaining these cables.

Refer to *Installation and Assembly of Coaxial Cable and Accessories* for a complete description of coaxial cables and their installation, including the following:

* Labeling, placement, and testing of coaxial cable
* Recommendations for indoor and outdoor cable runs
* Lightning protection
* Assembly procedures to fabricate coaxial cable from component parts
* Cable specifications
* Cable routing.

## IBM Cabling System Media

IBM Cabling System media can be used to attach terminals to the 3174 or 3299. Complete planning and installation of the IBM Cabling System constitute a major task beyond the scope of this book. After discussing the IBM Cabling System with an IBM representative, refer to the following publications for detailed description and planning information:

* *Using the IBM Cabling System with Communication Products*
* *IBM Cabling System Planning and Installation Guide*
* *A Building Planning Guide for Communication Wiring*
* *IBM Cabling System Catalog*
* *IBM Token-Ring Network Introduction and Planning Guide.*

The 3174 uses a dual-purpose connector (DPC) jack and does not require a balun when connected to IBM Cabling System media type 1, 2, or 9.

The highlights of the IBM Cabling System are illustrated in Figure 4-21 on page 4-39. Figure 4-21 also shows how IBM Cabling System media are connected to a 3174; it identifies the major connection points in the IBM Cabling System.

When it is not feasible to cable directly between a 3174 and attached devices, cables are routed through distribution panels. The panels are represented in Figure 4-21 by the rectangular areas labeled "IBM Cabling System" and are described in the supporting documentation for the IBM Cabling System.

IBM Cabling System DPC attachment cables that can be used with the 3174 are listed in Table 3-2. These cable assemblies have an IBM DPC at one end and an IBM Cabling System data connector at the other end.

| Table 3-2. Summary of IBM Part Numbers for IBM Cabling System Media | | |
|---|---|---|
| Device | IBM Preassembled Cable Assembly | Length |
| terminal | 6339073[1] | 2.4 m (8 ft) |
| 3299 | 6339074[1] | 9.1 m (30 ft) |
| 3174 | 6339075[2] | 2.4 m (8 ft) |

[1]Single IBM Cabling System DPC attachment cable

[2]Dual IBM Cabling System DPC attachment cable

## IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter

The 3270 Coax-to-Twisted-Pair Adapter is a combination *balanced-to-unbalanced* converter (balun) and filter. You use the adapter for converting from coaxial to twisted-pair wiring, or vice versa, in the system.

The adapter consists of a length of coaxial cable with a BNC connector on one end, a balun, and a length of twisted-pair cable terminated in a miniature 6-pin modular plug at the other end. An adapter is used at the terminal device and at the 3174 or 3299 Terminal Multiplexer Models 1 and 2 to connect to the twisted-pair telephone wire terminated at miniature 6-pin modular jacks. An adapter is not required at the 3299 Model 3 end of the wire, because the device is designed to connect twisted-pair telephone wire directly. The adapter assembly is 5.5 m (18 ft) long.

Coax-to-twisted-pair adapters are also available from other manufacturers. Some of these adapters do not include the wire necessary to attach the terminal to the wall-mounted modular telephone jack. When these adapters are used, it is important that the proper wire be selected for making this connection. Note that even short lengths of common parallel telephone wire, such as that sold by telephone and electronic retail stores, may cause malfunctions of 3270 devices. To obtain proper wire for this use, see your IBM representative.

For details about the 3270 Coax-to-Twisted-Pair Adapter, refer to the *IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter Planning and Installation Guide*.

## Type 3 Media (Twisted-Pair)

Specified twisted-pair wire can be used to attach terminals to a 3274/3174 or 3299 Terminal Multiplexer. Depending on the configuration and specific device types, an IBM 3270 Dual-Purpose Connector to Twisted-Pair (DPC-T3) Adapter or an IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter (CTPA) is normally required.

For information about environmental considerations for the DPC-T3 adapter, see "Ensuring Compatibility" on page 3-7.

# IBM 3270 Dual Purpose Connector to Twisted Pair Adapter

The Dual-Purpose Connector to Twisted-Pair (DPC-T3) adapter (P/N 83X9758) allows direct connection to a 3174 or 3299 Terminal Multiplexers to 3270 devices having the dual-purpose connector, by means of twisted-pair wiring.
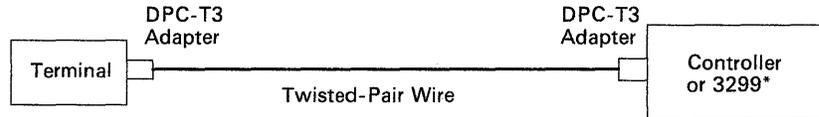


\* A DPC-T3 adapter is not required at the end of a
twisted-pair wire that attaches to a 3299 Model 3.

Figure   3-1.  How the DPC-T3 Adapter Works

**Note:**  The 3299 Model 1 does not attach to the DPC-T3 adapter.

The adapter matches the electrical characteristics of the display device to the telephone wire and filters the signal to prevent electrical interference to and from other equipment.

You are responsible for planning, ordering, installing, and maintaining the cabling system used with the 3270 DPC-T3 adapter and should contact the appropriate architect, engineer, consultant, or contractor for guidance and assistance when required.

If necessary, you should also arrange for professional consultant services in the planning of an installation to ensure that national, state, and local code requirements are met.  In particular, you should make sure that networks for 3270 data streams are separated from the public switched network.

## Ensuring Compatibility

To ensure that the 3270 DPC-T3 adapter works properly with your cabling system, you should make sure that it is compatible with the devices that you will be using with it. This section lists the devices that are compatible with the DPC-T3 adapter and the adapter's characteristics.

The 3270 DPC-T3 adapter is compatible with the following IBM 3720 Information Display System Type A devices having the IBM Dual-Purpose connector:

- 3174
- 3191 Display Station
- 3192 Color/Mono/Graphics Display Station
- 3278 Emulation Adapter (half-card) for IBM PC
- 3299 Terminal Multiplexer Model 2
- 5209 Link Protocol Converter
- Personal System/2 with 3278/3279 Emulation Adapter (P/N 83X9670) and 3270 Connection (P/N 83X9702) features.
- Personal System/2 Models 50, 60, and 80, 3270 Connection (P/N 83X9702, F/N 2000).

## Wiring System

The wiring system must:

- Maintain polarity on the twisted-pair link

- Be a point-to-point metallic circuit

- Have no bridge taps, branches, stubs, or Ys

- Have no loading (such as protective devices, lightning arresters, and similar devices)

- Have no interface units

- Have proper, high-quality punchdown connections (or equivalent)

- Have no wire pairs in the same cable as public switched lines, such as Private Bank Exchange – Control Office (PBX – CO) trunks and off-premises extensions (FCC regulation)

- Use no undercarpet or flat cable

- Be contained within a single structure.

Whenever possible, you should separate digital and voice wiring bundles between wiring closets.

## Twisted-Pair Cable (IBM Cabling System Type 3 Specifications)

Twisted-Pair cable should meet the following requirements:

Material       22/24 American Wire Gauge (AWG) or 0.5 or 0.6 mm, solid
               copper with two twists per 305 mm (12 in.), minimum.

DC Resistance  93.8 ohms per km (3280 ft), maximum.

Attenuation    The maximum attenuation is as follows:

| At 1 km (3280 ft) | At 1000 ft (304 m) |
|---|---|
| -13.11 dB at 256 kHz | -4.00 dB at 256 kHz |
| -18.56 dB at 512 kHz | -5.66 dB at 512 kHz |
| -22.07 dB at 772 kHz | -6.73 dB at 772 kHz |
| -26.23 dB at 1000 kHz | -8.00 dB at 1000 kHz |

## Physical Interfaces

The 3270 DPC-T3 adapter has 4.5 m (15 ft) of unshielded twisted-pair wire. The end attached to the 3270 device has an IBM DPC; the other end has a standard 6-pin, modular connector, such as a 6-pin modular jack connector.

**Note:**  The 6-pin modular jack connector is not on the 3270 DPC-T3 adapter for European countries. In those locations, the twisted-pair wire is prepared to be connected to a telephone connector that is commonly used in those countries.

At a typical office end, the adapter connects a 3270 device either to a duplex 6-pin modular jack wall plate (for voice and data connections) or to an independent 6-pin modular jack or equivalent modular block (capable of a full 6-pin connection). The adapter connects to pins 2 and 5 for both transmitting and receiving. Twisted-pair wire runs from the 6-pin modular jack or equivalent to a satellite distribution frame (SDF), where adapter signals are normally separated from telephone/switched signals.

At the 3174 end, punchdown blocks (or their equivalent) separate the twisted-pair cable into 6-pin modular jacks. The adapter runs from the 6-pin modular jack or equivalent to either a 3299 Terminal Multiplexer Model 2 or a 3174.

The 3270 DPC-T3 adapter performs a function similar to that of the CTPA, which is available in the United States and Canada only. The 3270 DPC-T3 adapter can be used only with 3270 devices that have an IBM DPC. It should not be used with a telephone wire run shorter than 30.5 m (100 ft) or longer than 275 m (900 ft). The 3270 DPC-T3 adapter is, however, available at a lower cost.

## Possible Configurations

A number of different configurations are possible with the DPC-T3 adapter, each offering advantages and disadvantages. Three possible configurations are shown along with the limitations of each configuration.

## Replacing Coaxial with Adapters and Twisted-Pair

This configuration is identical to the traditional 3270 network except that adapters and twisted-pair cable replace coaxial cable. In this configuration, the distance from adapter to adapter must be between 30.5 m (100 ft) and 275 m (900 ft).
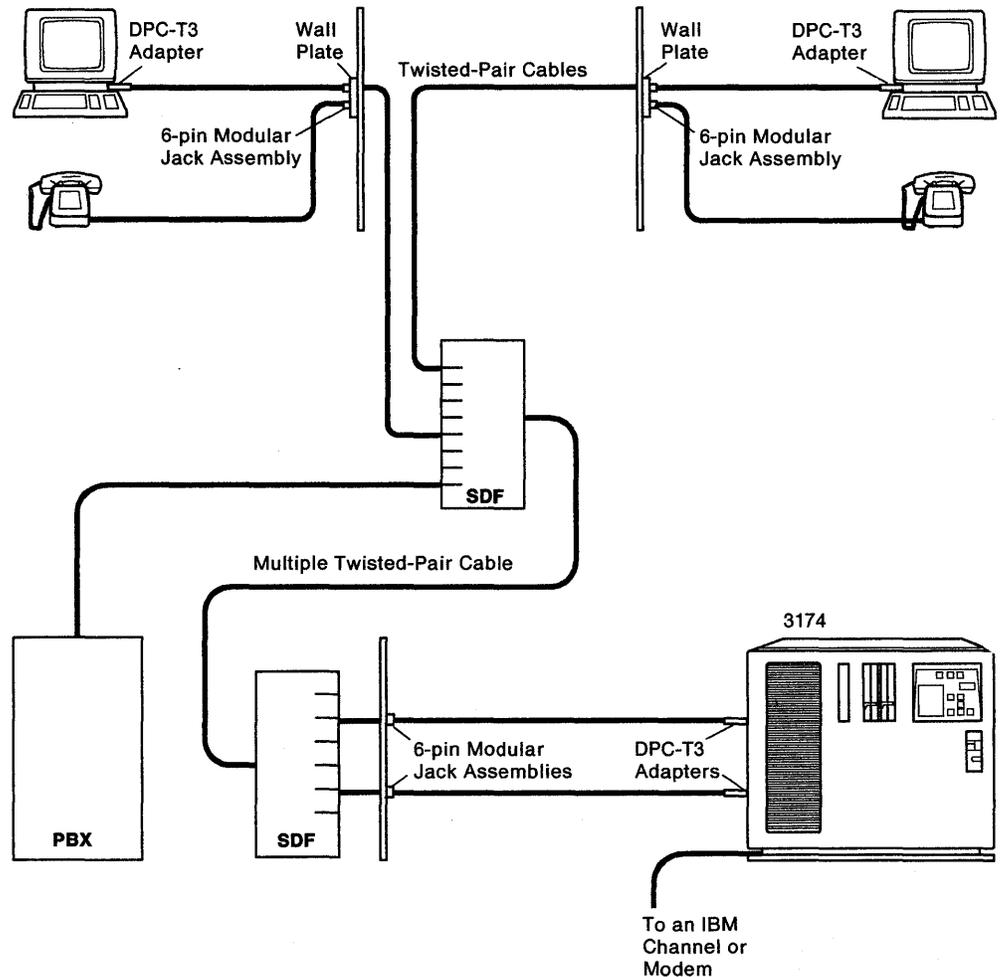


Figure  3-2.  A 3270 Installation Using DPC-T3 Adapters and Twisted-Pair Cable

## Combining Adapters with Twisted Pair and Coaxial

In this configuration, adapters are combined with twisted-pair cable and coaxial cable. In this configuration, no telephone cable can be run less than 30.5 m (100 ft). The length of the coaxial and twisted-pair cables must satisfy the following formula:

$$(coax \leq 20) + (length\ of\ twisted\text{-}pair) = \leq 900\ feet$$
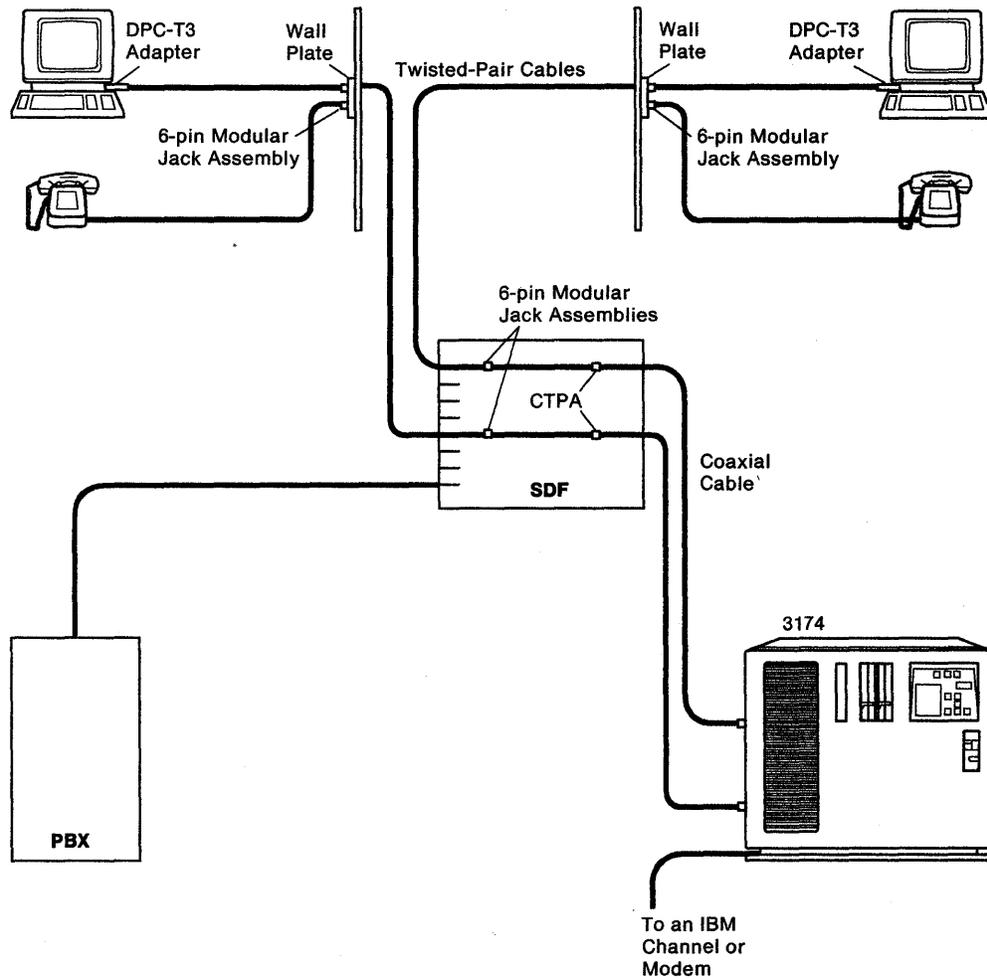


Figure   3-3.   A 3270 Installation Using DPC-T3 Adapters with Coaxial and Twisted-Pair Cable (U.S. and Canada only)

## Adding One 3299 Terminal Multiplexer

In this configuration, a 3299 Terminal Multiplexer Model 3 is added. The distance limitations for this configuration are as follows:

* Distance from 3299 to 3174 ≤ 1500 m (4920 ft) — Coax

* Distance from adapter to 3299 Model 3 must be between 30.5 m (100 ft) and 275 m (900 ft).

**Note:** The 3299 Model 3 can be replaced with a 3299 Model 2. In this case, a 3270 DPC-T3 would also be required at the 3299 ends of the telephone wire.
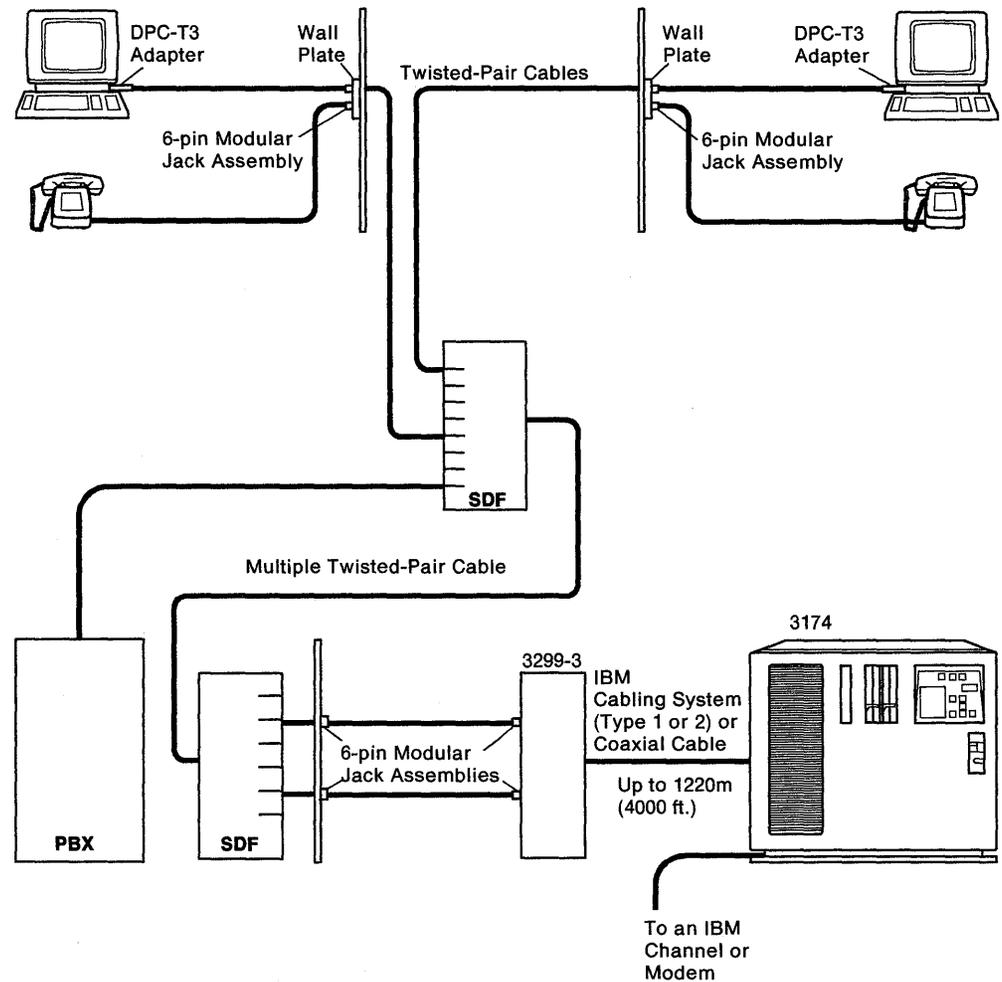


Figure 3-4. A 3270 Installation Using DPC-T3 Adapters and a 3299 Terminal Multiplexer Model 3

# Installing a 3270 DPC-T3 Adapter

Before you install a DPC-T3 adapter, make sure that the environment will accept adapters. You are responsible for installing wiring where necessary and for running tests on the equipment to locate problems.

**Note:** Make sure polarity is maintained throughout the twisted-pair connection and that there are no stubs or lengths of parallel wire in the cable run. The RJ-11 connector on the DPC-T3 adapter uses pins 2 and 5.

You should have an effective labeling and record-keeping system that allows you to do the following:

- Relocate devices
- Make alterations quickly and easily
- Isolate faults in the overall network
- Prevent accidental disconnection of a data communications circuit
- Prevent accidental connection of a 3270 device to a PBX or of a telephone to a 3174.

Label each adapter with enough information to enable you to find the other end of the circuit. For example, assign a unique block of sequential numbers to each multiple-pair cable that runs from distribution frame to distribution frame. Then assign a number from this block of numbers to each twisted-pair wire within the cable. Label each end of the pair with this number at both the distribution frame and the adapter.

# Avoiding Interference on Signal Cables

To avoid interference on your signal cables, follow these guidelines:

**Pocket-paging systems**    Some low-frequency pocket-paging systems are sensitive to the low-level signals used in the 3174 subsystem. To prevent interference, do not route communication cables close to existing systems.

When the installation of a paging system is being planned at a site with an IBM system already installed, review the plan with your IBM representative to ensure compatible operation of the paging system.

**Telephone lines**    You can run coaxial cable and IBM Cabling System media in the same conduit as telephone lines without adverse effect.

**Communication Lines**    Do not route signal cables with other communication lines, such as process, monitoring, or control system circuits. Radio frequency sources (RFI) such as television, radar, and radio, may cause interference on signal cables.

# Using the Asynchronous Emulation Adapter (AEA)

The customer is responsible for supplying Asynchronous Emulation Adapter (AEA) cables for connection between all 3174 AEA ports and ASCII terminals or host computers (via the EIA 232D interface to DTE) and modems (via the EIA 232D interface to DCE).

The Asynchronous Emulation Adapter has eight connectors. They are numbered 0 to 7 as shown in Figures 3-5 and 3-6. Connections from the AEA to terminal, host, or modem are made through 25-pin D connectors.
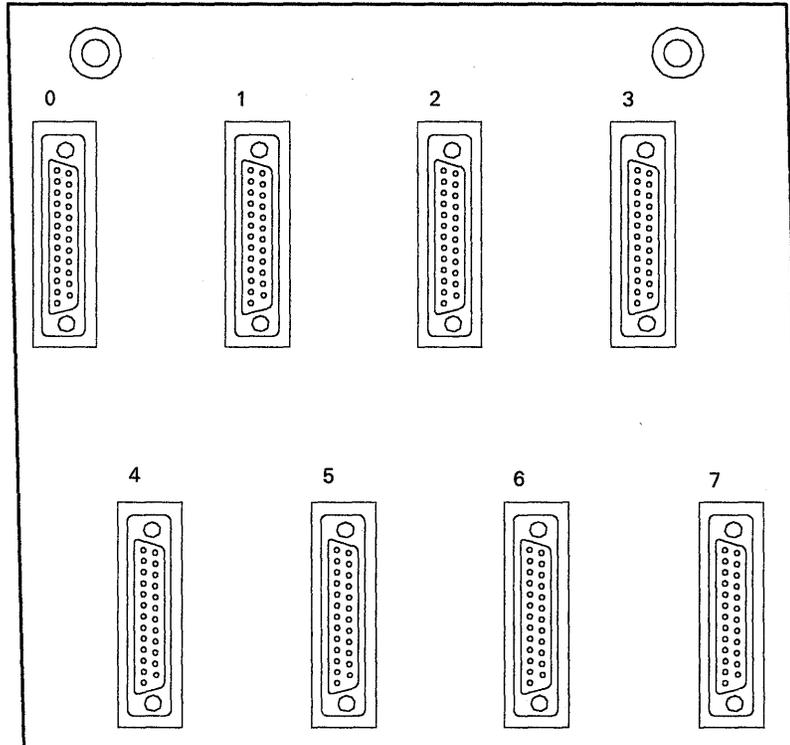


Figure   3-5.  AEA Connectors for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R
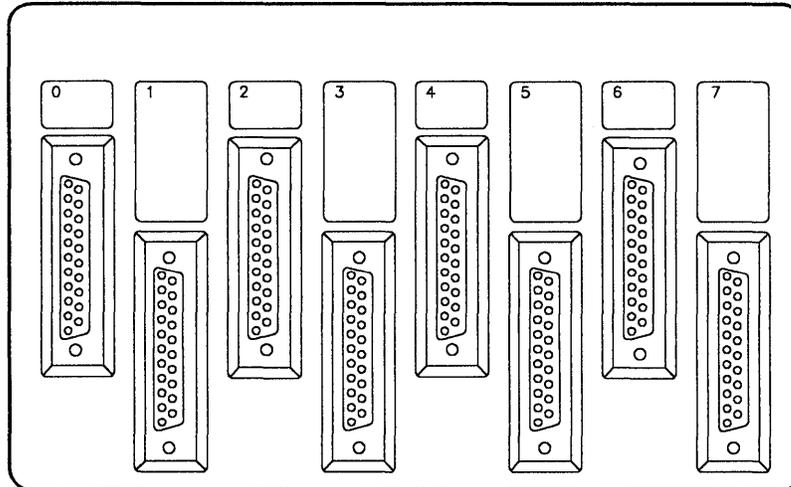
Figure 3-6. AEA Connectors for Models 51R, 52R, 61R, 62R, and 63R

## Attaching Terminals, Hosts, and Modems to the AEA

Attach ASCII terminals, ASCII hosts, or modems to the 3174 AEA connectors using IBM-specified EIA 232D interface cables. These cables must contain a minimum of nine wires and have a maximum length of 15 m (50 ft). Detailed specifications are given in the following sections.

### Bulk Cable Requirements

| | |
|---|---|
| Overall shield | Shield must be polyester-backed aluminum foil with continuous-drain wire. Conductive surface and drain wire out. 100% coverage with minimum 50% overlap. |
| Outside jacket | Polyvinyl chloride (PVC) |
| Capacitance | Total capacitance as measured from any lead to all other leads and shields tied together must not exceed 40 pF/ft maximum. |
| Dielectric strength | Wire in the finished cable must withstand, without breaking down at room ambient temperature, a minimum test voltage of 300 V 50/60 Hz root mean square (rms) for 1 minute between individual conductors and between individual conductors and shields. |

## Conductor Requirements

| | |
|---|---|
| Material | #24 AWG, 7/32 stranded, tinned copper |
| Individual Conductor Shield | Polyester-backed aluminum foil outside to ensure contact with central drain wire |
| No. Individual Shielded Conductors | Four |
| Insulation | Solid polypropylene |
| Voltage Rating | 30 V at 60° C |
| Drain Wires | Both central and outside, #24 AWG, 7/32 stranded. |

## Connector Requirements for the 3174 End

| | |
|---|---|
| Connector Housing | 25-pin D connector having tin-plated metal housing with grounding indents |
| Contacts | Male pins |
| Shell | Metal with captivated retainer screws long enough to be grasped and turned with the fingers |
| Ferrule | Split ring, aluminum. |

## Connector Requirements for the ASCII Device or Host End

*This information may or may not apply depending on OEM specifications.*

| | |
|---|---|
| Connector Housing | 25-pin D connector having tin-plated metal housing with grounding indents |
| Contacts | Male or female pins depending on the terminal type |
| Shell | Metal with captivated retainer screws long enough to be grasped and turned with the fingers |
| Ferrule | Split ring, aluminum. |

## Cable Labeling Requirements

All cables should be labeled on each end.  For DTE cables, the label should be located 305 mm (1 ft) from the connectors.

One label should contain the following:

        FROM END - 3174
        EIA 232D DTE
        CABLE LENGTH ___ FT

The other label should contain the following:

        TO END - REMOTE
        EIA 232D DCE
        CABLE LENGTH ___ FT

# Pin Assignments and Cable Wiring for Creating Your Own Cable

Signal wire terminology follows one of two conventions: abbreviations for functional description or signal line designations. The following table includes both conventions.

| Signal Name | Abbreviation | Signal Line Designation |
|---|---|---|
| Frame Ground | (FG) | AA |
| Transmit Data | (TD) | BA |
| Receive Data | (RD) | BB |
| Request To Send | (RTS) | CA |
| Clear To Send | (CTS) | CB |
| Data Set Ready | (DSR) | CC |
| Signal Ground | (GND) | AB |
| Data Carrier Detect | (DCD) | CF |
| Data Terminal Ready | (DTR) | CD |
| Ring Indicate | (RNG) | CE |

## Connecting the AEA Directly to a Host or Terminal

Figure 3-7 shows the pin assignments and cable wiring necessary to fabricate a cable that goes from the AEA connector (DTE) directly (no modem) to an ASCII display or host (DTE).

**Note:** The signal wires are crossed to allow a DTE to connect directly to another DTE. The signal wires are crossed to emulate a DCE.
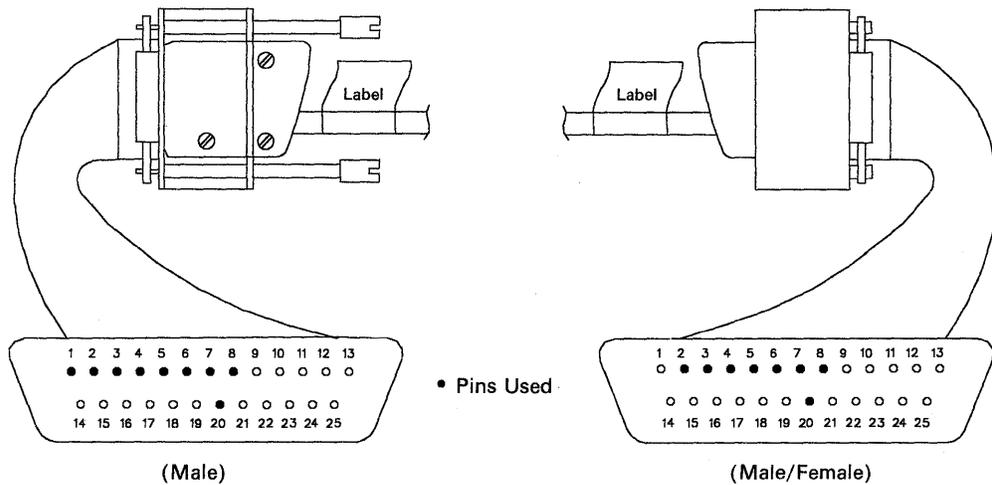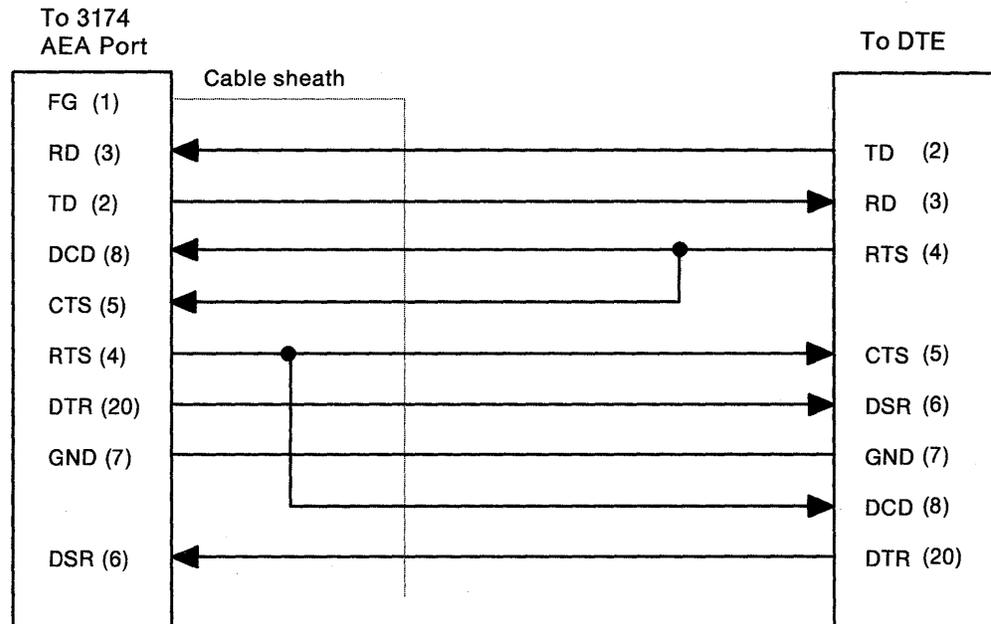


Figure 3-7. EIA 232D External Interface Cabling to a DTE

## Connecting the AEA to a Modem

Figure 3-8 shows the pin assignments and cable wiring necessary to fabricate a cable that goes from the AEA connector to a modem.

**Note:** Wiring between connectors is straight through (no crossovers).

```
Controller                                    DCE Male
25-Pin Male                                   Connector
Connector Pin                                 Pin

                    Cable
                    Sheath
   FG(1)         . . . . . . . . .
                            :        RD
   RD(3)  ◄──────────────────────────────     3
                            :        TD
   TD(2)  ────────────────────────────►       2
                            :        CTS
   CTS(5) ◄──────────────────────────────     5

                            :
                            :        CD
   CD(8)  ◄──────────────────────────────     8
                            :        RTS
   RTS(4) ────────────────────────────►       4
                            :        DTR
   DTR(20) ───────────────────────────►       20
                            :        GND
   GND(7) ────────────────────────────►       7
                            :        DSR
   DSR(6) ◄──────────────────────────────     6
                            :        RNG
   RNG(22) ◄─────────────────────────────     22

                    External
                    Cable
```
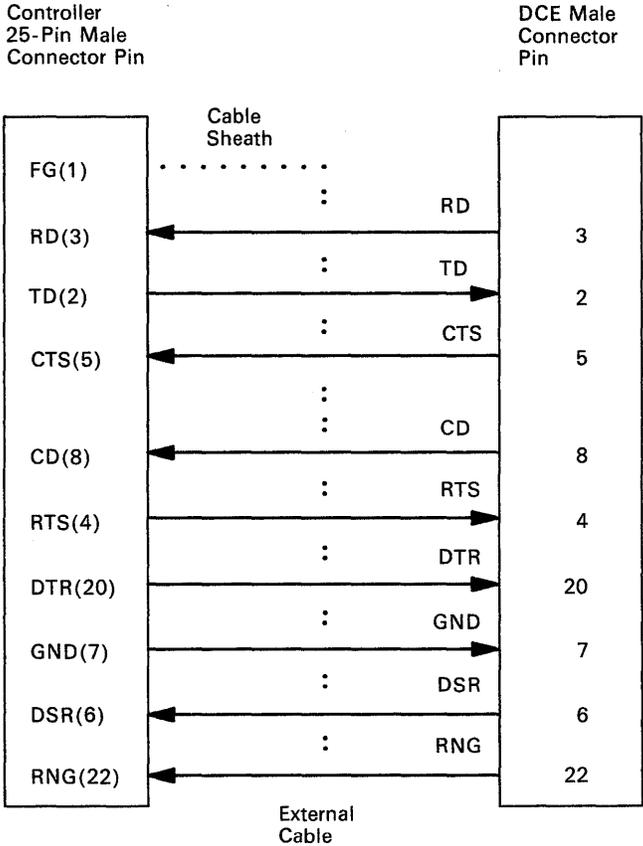
Figure   3-8. EIA 232D External Interface Cabling to a DCE

## Creating a Null Modem

A null modem is an adapter that allows you to connect a 3174 to a device without using a modem. Although null modems are commercially available, most do not contain the correct wiring pattern. The correct null modem wiring pattern is shown in Figure 3-9.

You may want to make your own null modem. Adapter kits that let you wire the modem yourself in the desired pattern are commercially available. You connect to this adapter two lengths of standard parallel cable using 25-pin connectors. Use of the adapter makes it possible to use standard one-for-one cable; that is, pin 1 at one end is connected to pin 1 at the other end, pin 2 at one end is connected to pin 2 at the other end, and so on. Nine wires are used for the connection.

The entire null modem/cable assembly may be no longer than 15 m (50 ft). One end of the null modem/cable assembly is connected directly to the AEA connector at the 3174, and the other end is connected to the device.
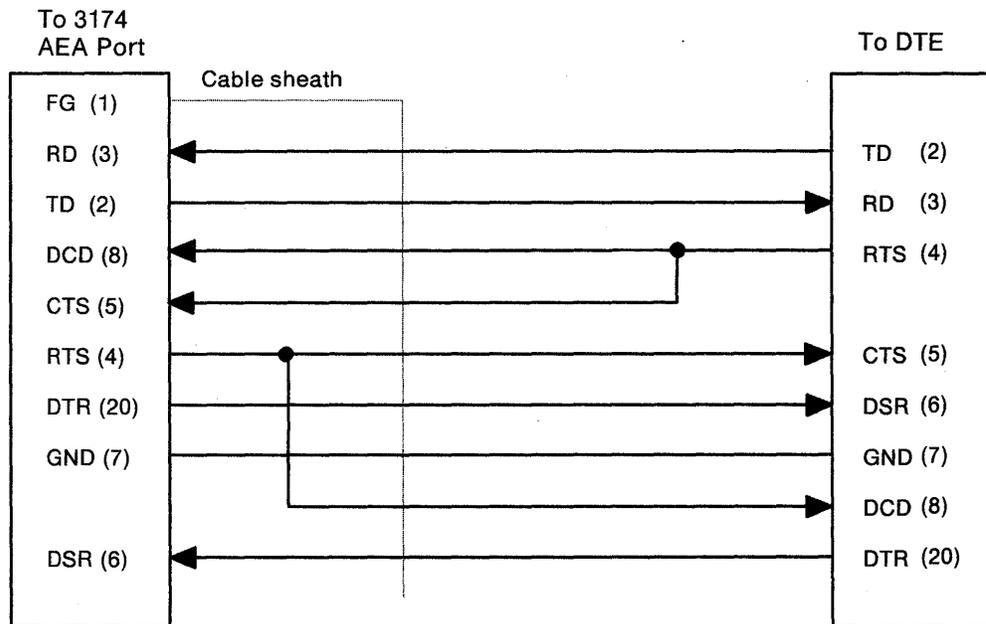


Figure   3-9. Null Modem Wiring

# Using the Concurrent Communication Adapter (CCA)

The customer is responsible for supplying the cables for connecting the Concurrent Communication Adapter to the 3270 host. You can order the Concurrent Communication Adapter with one of two different types of communication interface:

- The Type 9263 Concurrent Communication Adapter has an interface that conforms to the EIA 232D and CCITT V.35 standards. The feature numbers that provide the adapter and cables are as follows:

  - Feature number 3050 provides an adapter and an EIA 232D cable.

  - Feature number 3051 provides an adapter and a CCITT V.35 cable.

  - Feature number 3052 provides an adapter and a CCITT V.35 cable with one millimeter connector pins. This feature is available only in France for use with PTT mandatory modem CIT Er.BdB.48/10.

- The Type 9267 Concurrent Communication Adapter has an interface that conforms to the CCITT X.21 standard. Feature number 3053 provides an adapter and a CCITT X.21 cable.

Figure 3-10 shows the 25 pin D-connector on the front of the CCA.

Figure   3-10. The Concurrent Communication Adapter

# Replacing a 3274 with a 3174

Terminal cables, channel cables, and sequencing control cables originally provided for the 3274 can be used with the 3174. The communication cable supplied with the 3174 must be used to attach to the modems. The cable supplied with the 3174 Models 3R and 13R is used to attach to an IBM Token-Ring Network.

**Note:** You will need a channel cable for the 3174 that is between 460 mm (18 in.) and 915 mm (36 in.) longer than the 3274 channel cable, depending on where the 3174 is positioned. The 3274 channel cable is attached to the lower right front of the 3274; the 3174 channel cable is attached to the top left corner of the 3174.

# Attaching Address Labels to Terminals

Hexadecimal address labels (IBM P/N 4804705) are shipped with the 3174 (for the IBM Token-Ring Network). After each terminal is set up, attach a label that specifies the terminal network address to the address label holder on the terminal.

It is recommended that a designated person in your organization do the following:

1. Obtain the network addresses from the system programmer
2. Distribute the address information to the person who will attach the address labels.

For information concerning SNA network addresses, refer to *Systems Network Architecture General Information Network Addresses*. For information concerning binary synchronous communication (BSC) network addresses, refer to the *3174 Functional Description*.

# Using the 3299 Terminal Multiplexer

The IBM 3299 Terminal Multiplexer can provide improved system flexibility by reducing the amount of cabling required in an installation and extending the distance between the 3174 and the terminals attached to it. The 3299 attaches as many as eight terminals; a single cable attaching the 3299 and the 3174 allows you to save significant amounts of cable.

The 3299 is of interest primarily to customers who are doing the following:

- Installing newly acquired 3270 systems
- Expanding existing systems
- Relocating large numbers of 3270 terminals.

The 3299 is usually installed at about the same time that cabling is installed.

For details about the 3299, see *IBM 3270 Information Display System IBM 3299 Terminal Multiplexer Product Information*.

**Notes:**

1. A balun is required when the 3299 Model 1 is being attached to the IBM Cabling System. A balun is not required for the 3299 Model 2 or Model 3 output connection.

2. A coax-to-twisted-pair adapter is required for a 3299 Model 1 or 2 if it is attached to twisted-pair on either input or output. A coax-to-twisted-pair adapter is not required for 3299 Model 3 outputs, only for input connections.

# Completing the 3174 Cabling Worksheets

The 3174 cabling worksheets are provided in Appendix G to help simplify marking and connecting the cables. Use the appropriate worksheet for your configuration. A worksheet should be completed for each 3174 cluster that you order. Copies of the completed worksheet should be given to the personnel who will install and mark the cables and to the personnel who will connect the cables to the 3174. In addition, a copy of the worksheet should be stored in the 3174 for future reference.

To assign the terminal cables, you should be aware of the following:

3174-attachable terminals:

Can attach the 3178, 3179, 3180, 3270 Personal Computer, 3191, 3192, 3193, 3278, 3279, 3290, and 3471 display stations to the 3174

Can attach the 3230, 3262, 3268, 3287 (with 3274/3276 Attachment feature—feature code 8331), 4224, 4234, 4245, 5578, 4250, and 5210 printers to the 3174

Can attach the 3852, 4201, 4202, 4207, 4208, and 4212 ASCII printers

Can attach the 3101, 3151, 3161, 3162, and 3163 ASCII display stations to the 3174.

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R:

Can directly attach four terminals without the Terminal Multiplexer Adapter (TMA) or the 3299.

Can use either four TMAs or four 3299s. Each TMA or 3299 can attach up to eight terminals.

Can use a combination of TMAs and 3299s, as long as the total is four or less.

Can attach a maximum of 32 terminals using TMAs and 3299s. An additional maximum of 24 ASCII terminals or hosts can be attached using Asynchronous Emulation Adapter features.

Models 51R, 52R, 53R, 61R, 62R, and 63R:

Can directly attach nine terminals without the 3299.

Can attach a maximum of 16 terminals using eight direct connections and one 3299.

Can attach a maximum of 16 terminals using two 3299s.

An additional maximum of eight ASCII terminals or hosts can be attached using the AEA feature on Models 51R, 52R, 61R, 62R, and 63R.

Models 81R, 82R, 91R, and 92R:

Can directly attach four terminals without the 3299

Can attach a maximum of eight terminals using one 3299.

A recommended procedure for installing terminal cables is provided in "Attaching Terminal Cables" on page 4-37.

# Chapter 4. Planning for Unit Placement and Terminal Cable Installation

This chapter describes the planning for 3174 unit placement and terminal cable installation. It provides worksheets necessary for unit placement and worksheet examples.

## Before Equipment Arrives

Some of the forms in this manual ask you to fill in information that is unique to your installation. It is recommended that you perform your installation in the following sequence:

1. Design a site floor plan showing the location of the 3174, surrounding equipment, power outlets, and telephone connections. It may be helpful to cut out the representations of the units from the acetate templates (copies) and then place the representations on the Site Floor Planning Worksheets. These worksheets are shown in Figure 4-1 on page 4-4, Figure 4-3 on page 4-6, and Figure 4-5 on page 4-8.

   ```
   ┌─ Permission to Copy ──────────────────────────────────────────────┐
   │                                                                    │
   │ You are authorized to copy the worksheets for your convenience. Make as │
   │ many copies of the worksheets as you need for site planning. Save the   │
   │ blank original for later planning.                                      │
   │                                                                    │
   └────────────────────────────────────────────────────────────────────┘
   ```

   The Site Floor Planning Worksheet for setup or add-on should include the following:

   - The location and relationships of the physical facilities (walls, doors, windows, partitions, furniture, and telephones).

   - The location of power outlets and any communication cables and receptacles. These should be indicated with clear, bold notes, and lines or symbols.

   - The position of each terminal in the subsystem. Use the plan views in Chapter 5, "Machine Specifications," and the Site Floor Planning Worksheet in this chapter to position each unit. The *3270 Information Display System Physical Planning Template* provides scale-size floor-plan views of the units.

     If the subsystem to be installed contains a relocated 3174 (rather than a new 3174), label it a *Relocated Controller*. Labeling the 3174 will help prevent confusion with the initial setup at the installation site.

   - If you are expanding an existing subsystem, show all units and indicate the newly added unit with a note.

   To use the Site Floor Planning Worksheet for relocation, include the position of each unit in the subsystem before relocation begins. Cross out the units to be relocated.

   **Note:** If you are performing a partial or complete relocation of a subsystem, you must plan, first, for relocation activities and then for setup activities.

To make an accurate site floor plan, refer to Chapter 5, "Machine Specifications," and to any other similar descriptions of equipment not included in this manual.

Examples of a site floor plan are shown in Figure 4-1 on page 4-4, Figure 4-3 on page 4-6, and Figure 4-5 on page 4-8.

2. Make sure that all required cables are installed. See Chapter 3, "Planning Subsystem Cabling," for more information about cabling.

**Warning:** Do not place any electrical or mechanical equipment on top of a 3174 Establishment Controller.

# Site Floor Planning Worksheet

Site Planner _____     Telephone _____

Location _____

Scale: 20 mm = 1 m (1/4 in = 1 ft)

Site Planner _Joe Smith_          Telephone _555-1234_

Location _Building 12, 2nd floor, aisle 2_

Scale: 20 mm = 1 m (1/4 in = 1 ft)

Front

Modem
(Note 3c)      M

Telephone      T
(Note 4)

Device
Cable          C
Connectors     O
(Note 3d)      N
               N

**Note:** The rear service clearance
may be reduced to 0 mm (0 in.)
without the asynchronous
emulation adapter

Figure   4-1. An Example of a Site Floor Planning Worksheet for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

**Notes:**

1. 3174 placement

   Where exact size is critical, see the dimensions on the machine specification pages in Chapter 5, "Machine Specifications."

   Leave space around the 3174 to allow for the service clearances shown (dashed line).

2. Cabling considerations

   a. Power cord

      Check to see that the AC power outlets are located close enough to each unit to allow connection of the power cord. The standard length of the AC power cord is 4.2 m (14 ft). An optional-length power cord of 1.8 m (6 ft) is also available (U.S. only).

   b. Channel cables and sequence control cables

      The cable entry/exit area (located under the front left side of the 3174) is used for these cables on 3174 Models 1L and 11L.

   c. Communication cable

      The modem required at a remote installation of a 3174 Model 1R, 2R, 11R, or 12R must be located close enough to the 3174 to allow connection of the communication cable. The communication cable supplied is 6.1 m (20 ft) or 12.2 m (40 ft).

   d. Terminal cables

      Terminal cables are attached:

      1) Directly to the 3174

      2) Through a 3299 Terminal Multiplexer that connects to terminals

      3) Through a connector rack, or cable receptacle(s) mounted on the wall that routes terminal cables to terminal locations outside the room.

   e. The IBM Token-Ring Network cable supplied with the 3174 Models 1L, 3R, 11L, and 13R is 2.4 m (8 ft).

   f. ASCII cables

      ASCII cables are attached:

      1) Directly to the 3174

      2) Through a modem that connects to the ASCII terminal or ASCII host.

3. It is a good idea to have a telephone in the same room as the 3174 for problem determination.

4. The symbols used in this figure are defined as follows:

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ⊠ | Cable Entry and Exit Area in Base of Unit | ┌ ─ ─ ─ | Optional Equipment Outline |
| ⊕ | Power Cord Exit | ──── ──── | Service Area Boundary |
| ▨ | Air Intake Area | + | Casters |
| ⌐‾╲ Swinging Gate | | O | Leveling Pads or Glides |
| ┌─── | Standard Equipment Outline | ↑ | Nonraised Floor Cable Exit* |

\* For table- or counter-top terminals, the space between the bottom of the terminal and the surface of the table or of the counter permits signal cable and power cords to enter and exit from any direction. Thus, cutouts in table or counter are not necessary.

Figure 4-2. Symbols Used in Plan Views

Site Planner _Joe Smith_     Telephone _555-1234_

Location _Building 12, 2nd floor, aisle 2_

Scale: 20 mm = 1 m (1/4 in = 1 ft)

Front

Modem (Note 3b) [M]

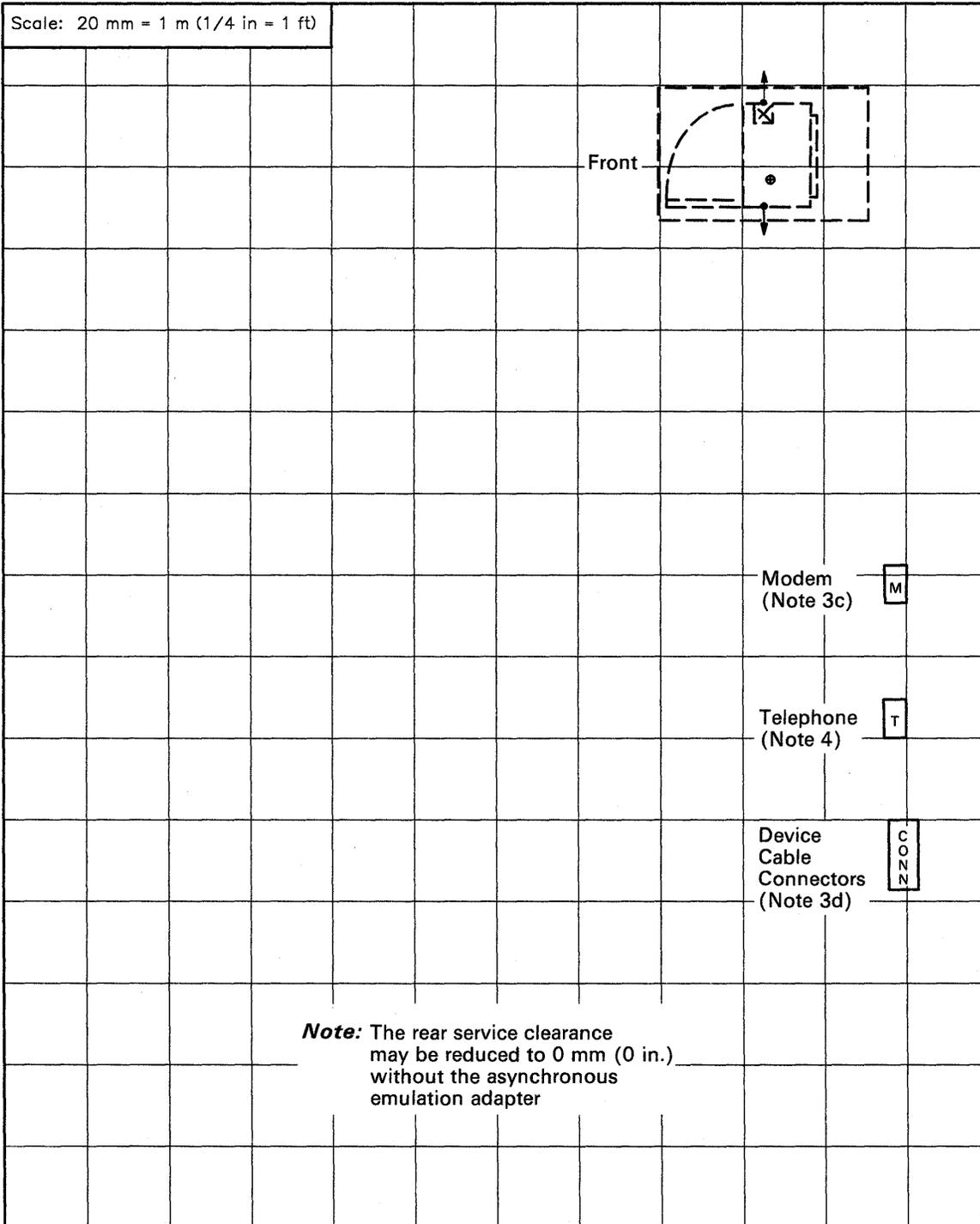Telephone (Note 4) [T]

Device Cable Connectors (Note 3c) [CONN]

Figure 4-3. An Example of a Site Floor Planning Worksheet for Models 51R, 52R, 53R, 61R, 62R, and 63R

**Notes:**

1. 3174 placement

   Where exact size is critical, see the dimensions on the machine specification pages in Chapter 5, "Machine Specifications."

   The Models 51R, 52R, 53R, 61R, 62R, and 63R are designed to be placed on a table top or in a standard (19-in.) rack. Leave space around the 3174 to allow for the service clearances shown (dashed line). The service clearance indicated at the rear of the 3174 is required *only* if the 3174 is installed in a rack.

2. Cabling considerations

   a. Power cord

      Check to see that the AC power outlet is located close enough to each unit to allow connection of the power cord. The standard length of the AC power cord is 4.2 m (14 ft). An optional-length power cord of 1.8 m (6 ft) is also available (U.S. only).

   b. Communication cable

      The modem required at a remote installation of a 3174 Model 51R, 52R, 61R, or 62R must be located close enough to the 3174 to allow connection of the communication cable. The communication cable supplied is 6.1 m (20 ft) or 12.2 m (40 ft).

   c. Terminal cables

      Terminal cables are attached:

      1) Directly to the 3174

      2) Through a 3299 Terminal Multiplexer that connects to terminals

      3) Through a connector rack, or cable receptacle(s) mounted on the wall that routes terminal cables to terminal locations outside the room.

   d. The IBM Token-Ring cable supplied with the 3174 Models 53R and 63R is 2.4 m (8 ft).

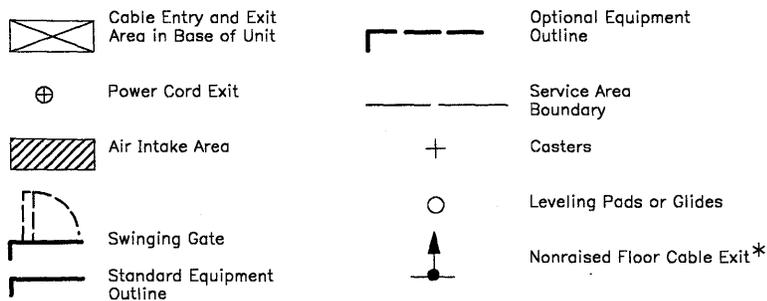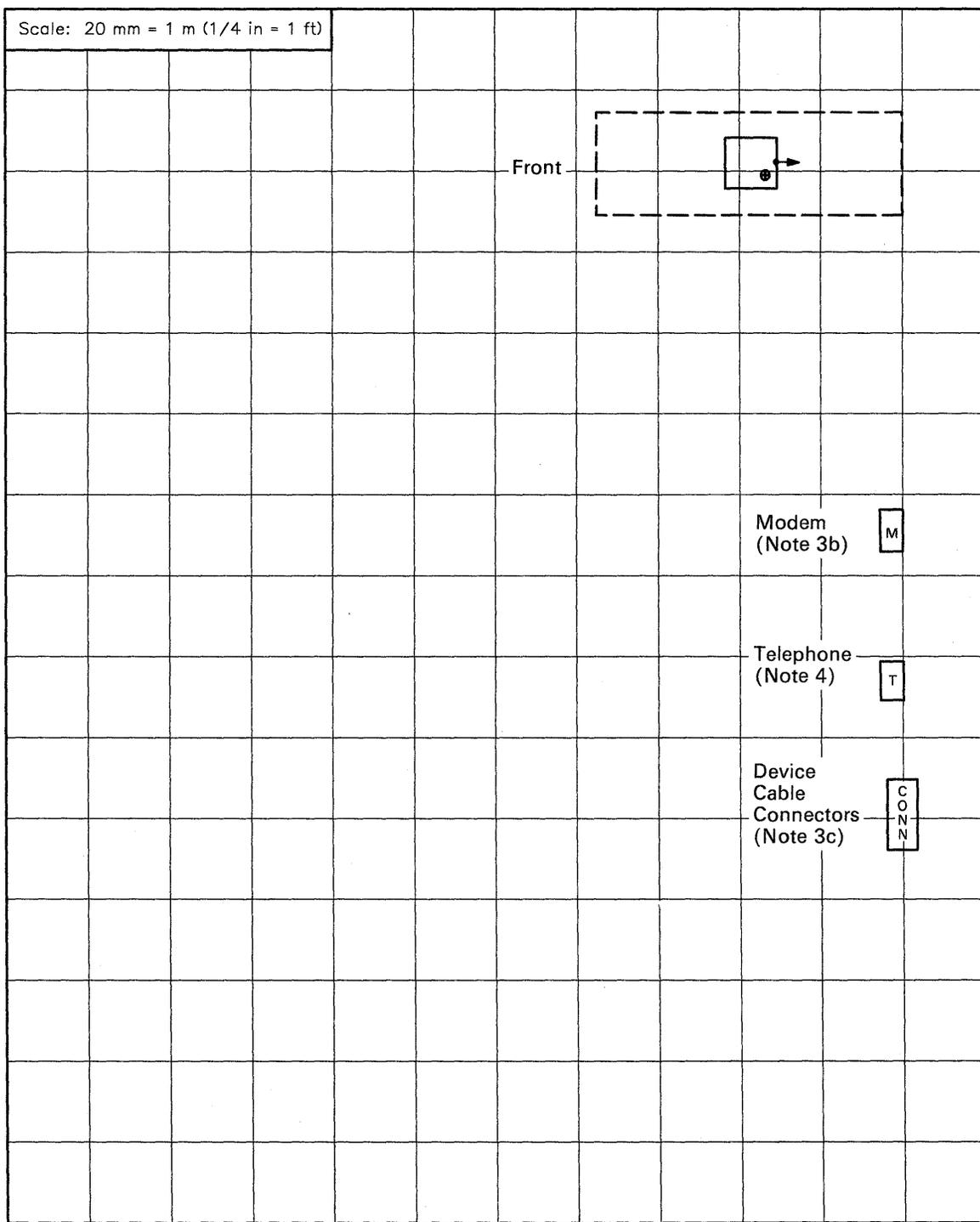   e. ASCII cables

      ASCII cables are attached:

      1) Directly to the 3174

      2) Through a modem that connects to the ASCII terminal or ASCII host.

3. It is a good idea to have a telephone in the same room as the 3174 for problem determination.

4. The symbols used in this figure are defined as follows:

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ⊠ | Cable Entry and Exit Area in Base of Unit | ┌ ── ── | Optional Equipment Outline |
| ⊕ | Power Cord Exit | ── ── | Service Area Boundary |
| ▧ | Air Intake Area | + | Casters |
| | Swinging Gate | ○ | Leveling Pads or Glides |
| | Standard Equipment Outline | ↥ | Nonraised Floor Cable Exit* |
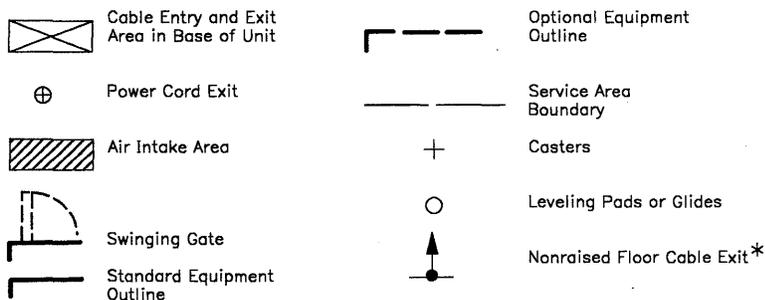
\* For table- or counter-top terminals, the space between the bottom of the terminal and the surface of the table or of the counter permits signal cable and power cords to enter and exit from any direction. Thus, cutouts in table or counter are not necessary.

Figure 4-4. Symbols Used in Plan Views

Site Planner  *Joe Smith*     Telephone *555-1234*

Location *Building 12, 2nd floor, aisle 2*

Scale:  20 mm = 1 m (1/4 in = 1 ft)

Front

Modem
(Note 3b)  [M]

Telephone
(Note 4)  [T]

Device
Cable
Connectors
(Note 3c)  [CONN]
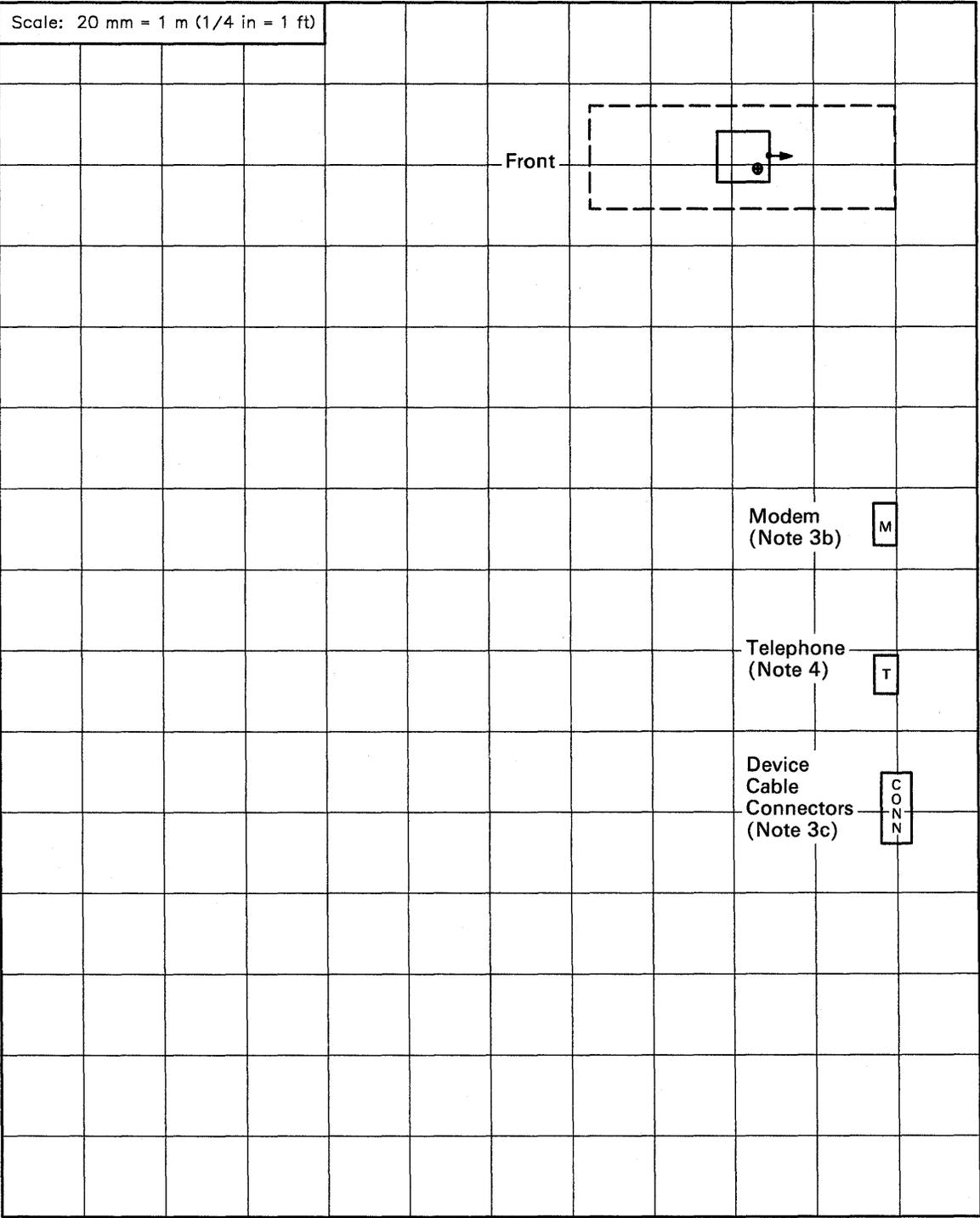
Figure   4-5. An Example of a Site Floor Planning Worksheet for Models 81R, 82R, 91R, and 92R

**Notes:**

1. 3174 placement

   Where exact size is critical, see the dimensions on the machine specification pages in Chapter 5, "Machine Specifications."

   The Models 81R, 82R, 91R, and 92R are designed to be placed on a table top or in a standard (19-in.) rack. Leave space around the 3174 to allow for the service clearances shown (dashed line). The service clearance indicated at the rear of the 3174 is required *only* if the 3174 is installed in a rack.

2. Cabling considerations

   a. Power cord

      Check to see that the AC power outlet is located close enough to each unit to allow connection of the power cord. The standard length of the AC power cord is 4.2 m (14 ft). An optional-length power cord of 1.8 m (6 ft) is also available (U.S. only).

   b. Communication cable

      The modem required at a remote installation of a 3174 Model 81R, 82R, 91R, or 92R must be located close enough to the 3174 to allow connection of the communication cable. The communication cable supplied is 6.1 m (20 ft) or 12.2 m (40 ft).

   c. Terminal cables

      Terminal cables are attached:

      1) Directly to the 3174

      2) Through a 3299 Terminal Multiplexer that connects to terminals

      3) Through a connector rack, or cable receptacle(s) mounted on the wall that routes terminal cables to terminal locations outside the room.

3. It is a good idea to have a telephone in the same room as the 3174 for problem determination.

4. The symbols used in this figure are defined as follows:



| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ⊠ | Cable Entry and Exit Area in Base of Unit | ⌐ ─ ─ ─ | Optional Equipment Outline |
| ⊕ | Power Cord Exit | ──── ──── | Service Area Boundary |
| ▨ | Air Intake Area | + | Casters |
| | Swinging Gate | ○ | Leveling Pads or Glides |
| ⌐─── | Standard Equipment Outline | ↑ | Nonraised Floor Cable Exit* |
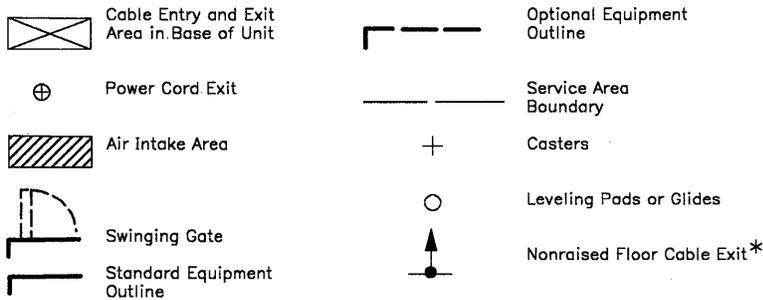
\* For table- or counter-top terminals, the space between the bottom of the terminal and the surface of the table or of the counter permits signal cable and power cords to enter and exit from any direction. Thus, cutouts in table or counter are not necessary.

Figure 4-6. Symbols Used in Plan Views

# After Equipment Arrives

When your equipment arrives and you are ready to install it, you will need some information that is packaged with the various units (unpacking instructions, setup instructions, and problem determination information). You will also need the customizing worksheets from the *IBM 3174 Establishment Controller Planning Guide.*

Typically, you will need to complete the following tasks when you are setting up a new site or expanding an existing configuration:

1. Unpack and set up the 3174 and other customer setup units, using the setup instructions provided.

2. Connect the terminals to the 3174. See the section "Attaching Terminal Cables" on page 4-37 for recommended procedures.

3. Customize the 3174. Refer to the *IBM 3174 Customizing Guide.*

# Using the 3299 Terminal Multiplexer

The 3299 allows you to increase the distance between the 3174 and its terminals and attach more terminals to the 3174 than the 3174 would otherwise support.

The 3299 (Figure 4-7) has nine connectors. The connector on the far left (not numbered) is used for the cable connection between the 3299 and the terminal adapter. The next eight connectors are numbered from left to right, 0 to 7. Connectors 0 through 7 are used for the cable connections between the 3299 and the individual terminals. Each connector supports one terminal.

The 3299 Model 1 has BNC coaxial cable connectors for attachment to the terminals. The 3299 Model 2 has DPCs that accept coaxial cable or IBM Cabling System twisted-pair wire. The 3299 Model 3 (U.S. and Canada only) has 6-pin modular telephone jacks for attachment of IBM Cabling System twisted-pair wire to the terminals and a DPC jack for connection to the 3174.

**Note:** The 3299 cannot be attached to the 3174 TMA.



Models 1 and 2                              Model 3 (U.S. and Canada only)
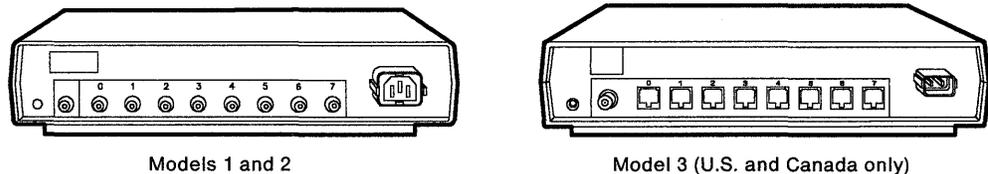
Figure 4-7. 3299 Terminal Multiplexer

# Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

The following sections describe the planning and terminal cable installation for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R.

## Defining the Subsystem Configuration

The subsystem configuration for each 3174 depends on the number of ports and types of terminal connectors on the 3174.

To identify the number of the port to which a terminal (display station or printer) is cabled, you need to do the following:

- Identify the connector number on the terminal adapter where the cabling originates.

- Identify whether a terminal is cabled *directly* to the terminal adapter connector or *indirectly* through a 3299 Model 1, 2, or 3 or a TMA.

  - If a terminal is cabled *directly* to a terminal adapter connector, that terminal's port number is the same as the terminal adapter connector number.

  - If a terminal is cabled *indirectly* to a terminal adapter connector through a 3299 or a TMA, the terminal's port number is determined by combining the numbers of the terminal adapter connector and of the 3299 or TMA connector.

- For Token-Ring attachment, see the *IBM Token-Ring Network Introduction and Planning Guide* for defining attachment identification.

The configuration also depends on the number and type of Concurrent Communication Adapters installed in the 3174.

The following sections describe how to locate each type of adapter. They also describe the terminal adapter and the TMA in detail.

## Identifying Adapter Cards

The 3174 logic board has 14 logic card slots (see Figure 4-8). The slots are labeled with numbers 11 through 24. Identify the location of the following logic cards:

- Type 915X terminal adapter. The terminal adapter is located in one of these slots: 21, 22, or 23 (model-dependent).

- Type 917X. The 3174 can have 0−4 TMAs. These cards can be located in slot 15, 16, 11, 23, 12, 17, 22, 24, or 13 only, according to your machine type and configuration. They are installed in this order in the first available slot.

- Type 9350 or 9351. The Token-Ring Adapter card can be in slot 12 for Model 1L or 11L and in slot 11 or 12 for Model 3R or 13R.

- Type 9331. The AEA cards can be in slots 14, 13, and 12 for AEA 1, AEA 2, and AEA 3, respectively.

- Types 9263 and 9267. The Concurrent Communication Adapter cards can be in slots 12 through 14 on Models 1L, 1R, 2R, and 3R. They can be in slots 11 through 17 in Models 11L, 11R, 12R, and 13R.
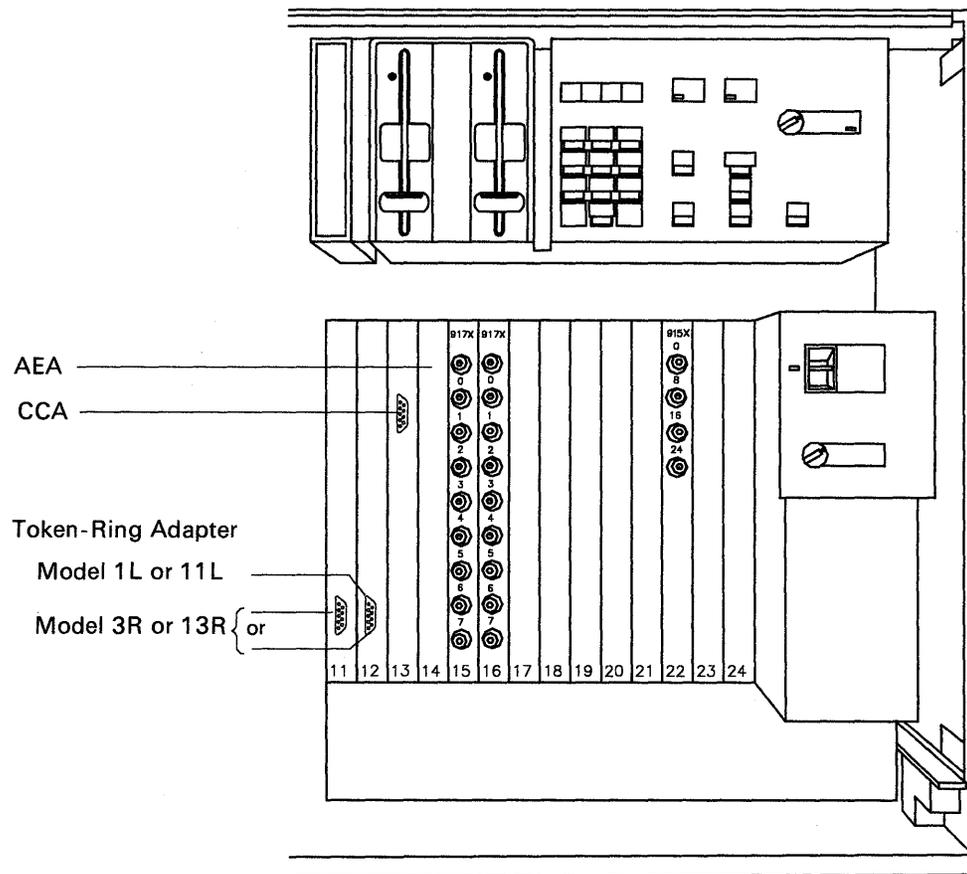


Figure   4-8.  3174 Logic Board with Labeled Slots.  The terminal adapter is in slot 22, and there are two TMAs, in slots 15 and 16.

## Using the Terminal Adapter

The terminal adapter (Figure 4-9) has four connectors. You can cable either one terminal, one TMA, or one 3299 Terminal Multiplexer to each connector on the terminal adapter card. Factory-installed TMAs are cabled to the terminal adapter at the factory. Each terminal adapter connector can support from one to eight terminals or remain unused.

Hardware group 26 has been assigned to this card. All terminals that connect to this card, directly or indirectly, will use the number 26 as a prefix to their terminal port number (for example, port 26-03).
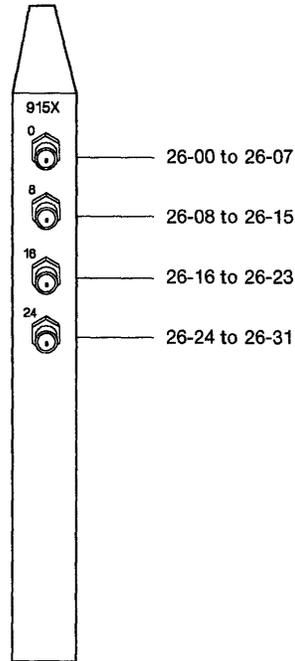


Figure 4-9. Terminal Adapter

## Using the Terminal Multiplexer Adapter

The TMA (Figure 4-10) has nine connectors on it. The top connector (not numbered) is used for the cable connection between the TMA and the terminal adapter. The next eight connectors are numbered 0 (top) to 7 (bottom). Connectors 0 through 7 are used for the cable connections between the TMA and the individual terminals. Each connector supports one terminal.

The TMA-to-terminal adapter cable position on the terminal adapter determines the terminal port range of the TMA.
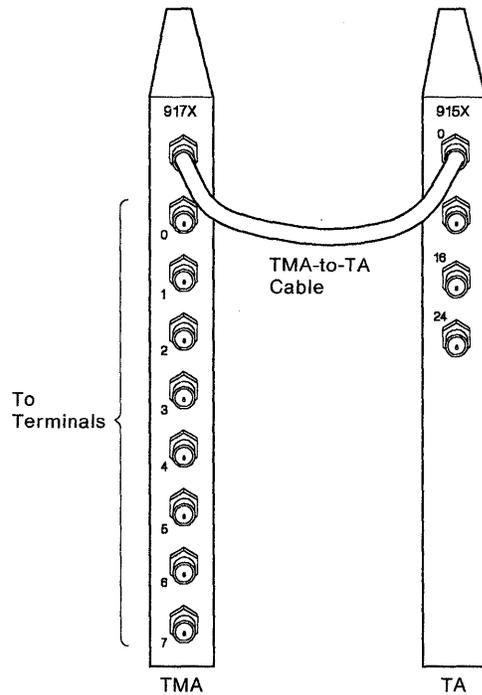


Figure 4-10. Cabling from Terminal Multiplexer Adapter to Terminal Adapter

## Determining a Terminal's Port Number

If a terminal is directly cabled to the terminal adapter, its terminal port number is the same as the terminal adapter connector number. For example, if the terminal is cabled to terminal adapter connector 16, its terminal port number is 26-16.

If a terminal is cabled indirectly to a terminal adapter connector through a 3299 or a TMA, the terminal's port is determined by combining the numbers of the terminal adapter connector and the 3299 or TMA connector. For example:

| Terminal Adapter Connector | + | 3299 or TMA Connector | = | Terminal Port |
|---|---|---|---|---|
| 0 | + | 0 | = | 26-00 |
| 8 | + | 4 | = | 26-12 |
| 16 | + | 3 | = | 26-19 |
| 24 | + | 5 | = | 26-29 |

## Completing the Worksheets

The 3174 cabling worksheets are in Appendix G. You can reproduce them in quantity so that you have an unused set available for future planning.

In addition to the 3174 cabling worksheets in Appendix G of this manual, you need additional worksheets for terminal cable attachment and connection to a host through a Token-Ring Network. Those worksheets are in the following manuals:

* *IBM Cabling System Planning and Installation Guide*
* *IBM Token-Ring Network Telephone Twisted-Pair Media Guide.*

Either the site planner or the customizing planner can fill out the 3174 cabling worksheets, but each probably needs to consult with the other to do this. Be sure to store a copy of the completed worksheet(s) in the 3174.

Give the installer a copy of the completed worksheets from Appendix G and a copy of the cabling instructions from Appendix H.

There are five types of worksheets for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R:

* Terminal Multiplexer Adapter (TMA) (Worksheets 1A – 1D)
* 3299 Terminal Multiplexer (Worksheets 2A – 2D)
* 3174 to Terminal (Direct Connection) (Worksheet 3)
* AEA (Worksheets 8A – 8C)
* Concurrent Communication Adapter (Worksheets 10A and 10B).

## Terminal Multiplexer Adapter Worksheets 1A – 1D

The TMA is an optional feature in the 3174. You can have as many as four TMAs. Complete one cabling worksheet for each TMA in your 3174. For instance, if you ordered two TMAs, you will probably want to use the TMA 1 and TMA 2 worksheets.

Fill out each TMA cabling worksheet as follows.

| In this column: | Enter this information: |
|---|---|
| TMA (1 – 4) Connector | Do not write anything in this column. This column lists the numbers that are printed next to the connectors on the TMA. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.<br><br>In this column, you write in the identification of the cable that physically attaches to each terminal. If you attached eight terminals to the TMA, you would write in eight cable IDs. |
| Terminal Type | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3279 Model S3G. |
| Terminal Location | Write a brief description of the terminal's physical location: building name or number, floor, and office number. |
| Terminal Port Number | Do not write in this column. This column lists the terminal port number associated with each TMA connector. |

## 3299 Terminal Multiplexer Worksheets 2A – 2D

You can attach as many as four 3299s to the 3174 terminal adapter. Complete the 3299 Terminal Multiplexer cabling worksheet for the terminal port ranges and number of 3299s that you require. For instance, if you have one 3299 that you want to connect to terminal adapter connector 8, fill out the 3299 worksheet for the port range 8 – 15.

Fill out each 3299 Terminal Multiplexer cabling worksheet as follows.

FROM 3174 TO 3299 TERMINAL MULTIPLEXER CABLING

| In this column: | Enter this information: |
| --- | --- |
| 3174 TA Connector (0, 8, 16, or 24) | Do not write anything in this column. This column lists the terminal adapter connector number that is printed next to the connector. |
| 3299 Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each 3299. |
| 3299 Model | Write in the model number of the 3299 that you assign to each port. This number will be either 1, 2, or 3. |
| 3299 Location | Write a brief description of the 3299's physical location: building name or number, floor, and office number. |
| 3299 ID | Write a name or a number to identify the 3299. |

FROM 3299 TERMINAL MULTIPLEXER TO TERMINAL CABLING

| In this column: | Enter this information: |
| --- | --- |
| 3299 Connector | Do not write anything in this column. This column lists the 3299 connector numbers that are printed next to the connectors on the front of the 3299. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each terminal. |
| Terminal Type | Write the type and model of the terminal that you assign for each port, for example, 3279 Model S3G. |
| Terminal Location | Write a brief description of each terminal's physical location: building name or number, floor, and office number. |
| Terminal Port | Do not write in this column. This column lists the terminal port numbers associated within the range for this cabling worksheet. |

## 3174 to Terminal (Direct Connection)

You can attach as many as four terminals directly to the 3174 terminal adapter. Complete one line of worksheet 3 for each terminal that you attach directly to the 3174 terminal adapter. For instance, if you have one terminal that you want to attach directly to connector 16, you fill out the line that corresponds with terminal adapter connector 16.

**Note:** Directly attached terminals should be attached to the first available connector on the terminal adapter, after any TMA or 3299 cables have already been attached to the terminal adapter.

Fill out the Direct Connection cabling worksheet as follows.

| In this column: | Enter this information: |
|---|---|
| TA Connector | Do not write anything in this column. This column lists the terminal adapter connector numbers that are printed next to the connectors on the 3174 terminal adapter. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each terminal adapter connector. |
| Terminal Type | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3279 Model S3G. |
| Terminal Location | Write a brief description of the terminal's physical location: building name or number, floor, and office number. |
| Terminal Port | Do not write anything in this column. This column lists the port number for each of the four terminal ports available. |

# Models 51R, 52R, 53R, 61R, 62R, and 63R

The following sections describe the planning and terminal cable installation for Models 51R, 52R, 53R, 61R, 62R, and 63R.

## Defining the Subsystem Configuration

The subsystem configuration for each 3174 depends on the number of ports and types of terminal connectors on the 3174. The Models 51R, 52R, 53R, 61R, 62R, and 63R each have terminal adapters that consist of nine connectors numbered from 0 to 8. These adapters are located on the rear of the units (Figure 4-11). Models 51R, 52R, 53R, 61R, 62R, and 63R do not include a TMA, unlike Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R, However, Models 53R and 63R have an additional adapter that provides attachment to a Token-Ring Network.
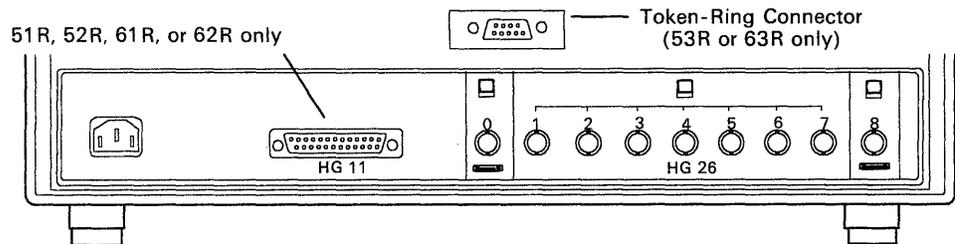


Figure 4-11. The Nine Connectors on Models 51R, 52R, 53R, 61R, 62R, and 63R

To identify the number of the connector to which a terminal (display station or printer) is cabled, you need to do the following:

- Identify the connector on the 3174 where the cabling originates.

- Identify whether the terminal is cabled *directly* to the 3174 connector or *indirectly* through a 3299 Model Terminal Multiplexer.

   - If a terminal is cabled *directly* to a 3174 connector, the terminal port number is the same as the 3174 connector number.

   - If a terminal is cabled *indirectly* to a 3174 connector through a 3299, the terminal port is determined by combining the numbers of the 3174 connector and 3299 connector.

In addition, you can install one Concurrent Communication Adapter in Models 51R and 63R and two Concurrent Communication Adapters in Models 61R and 62R. You can install one AEA in Models 51R, 52R, 61R, and 62R.

## Using the Terminal Adapter

The terminal adapter has nine connectors, numbered 0 to 8. Hardware group 26 has been assigned to the terminal adapter. All terminals that attach to these connectors, directly or indirectly, will use the number 26 as a prefix to their terminal number, for example, port 26-05. The following are restrictions on the type of device that you can cable to the 3174 connectors:

To **connector 0**, you can cable a display station, printer, or a 3299. If you cable a 3299 to connector 0, then you *cannot* use connectors 1 − 7.
To **connectors 1 − 7**, you can cable a display station or a printer. If you cable a 3299 to connector 0, however, you cannot use connectors 1 − 7.
To **connector 8**, you can cable a display station, a printer, or a 3299.

## Possible Configurations

**Attaching Terminals Directly to the Terminal Adapter:** If you want to connect your terminals directly to the terminal adapter, you can do so by connecting the terminals to terminal adapter connectors 0 through 8 as shown in Figure 4-12. You can connect as many as nine terminals in this way.
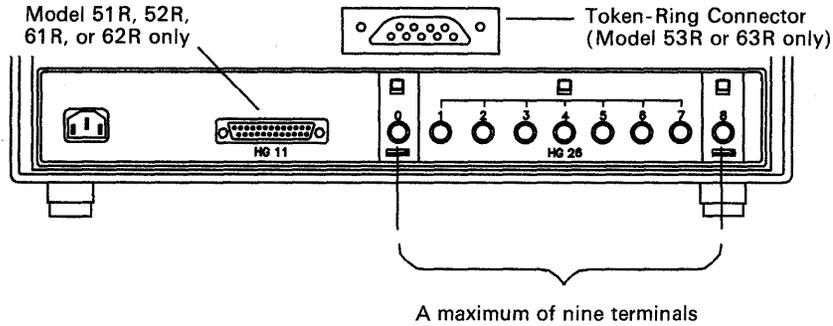
Figure 4-12. Models 51R, 52R, 53R, 61R, 62R, and 63R with Terminals Attached Directly to the Terminal Adapter

**Attaching One 3299 Terminal Multiplexer:** If you want to use one 3299 Terminal Multiplexer, you should connect it to terminal adapter connector 8 as shown in Figure 4-13. As many as eight terminals can then be connected to the 3299. And, by connecting the 3299 to connector 8, you can connect eight more terminals directly to terminal adapter connectors 0 through 7. This configuration then permits a maximum of 16 terminals to be attached to your 3174.
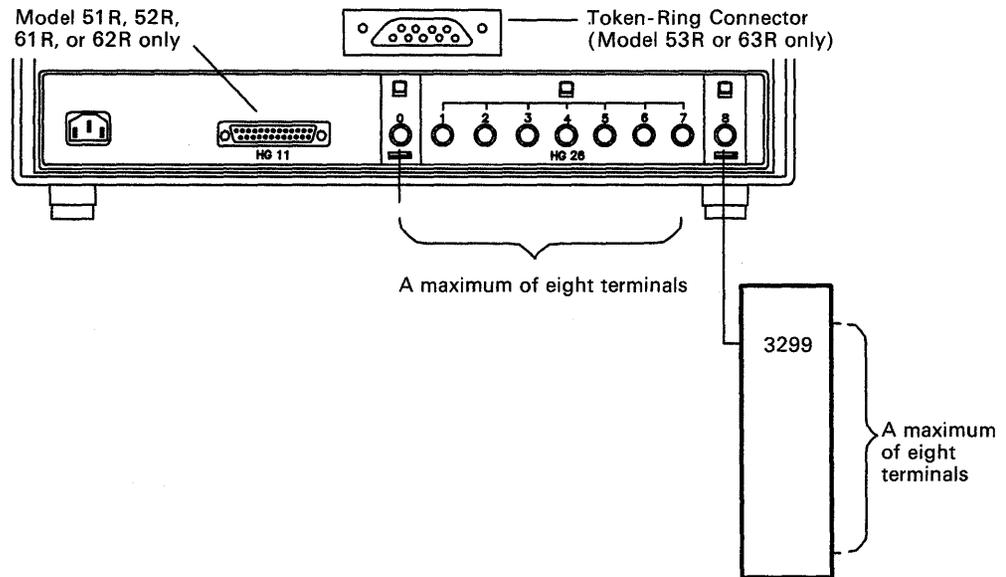
Figure 4-13. Models 51R, 52R, 53R, 61R, 62R, and 63R with One 3299 Terminal Multiplexer

**Attaching Two 3299 Terminal Multiplexers:** As an alternative to direct connections, a second 3299 can be attached to terminal adapter connector 0 as shown in Figure 4-14. If you do this, however, you cannot attach any terminals directly to connectors 1 through 7 of the terminal adapter; these connectors are automatically disabled. By using two 3299s, however, you can attach as many as eight terminals to each, for a maximum of 16 terminals.
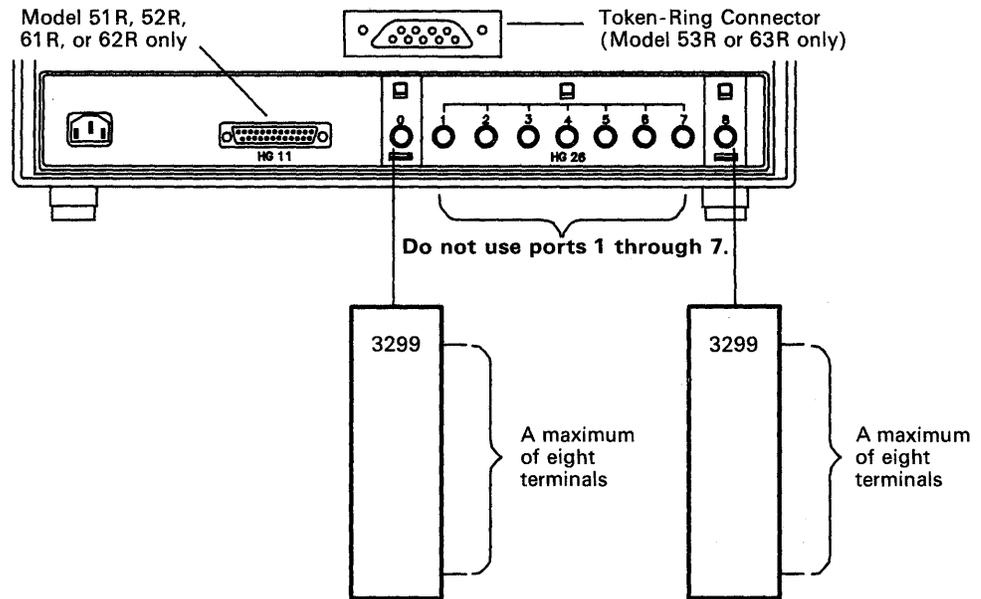
Figure 4-14. Models 51R, 52R, 53R, 61R, 62R, and 63R with Two 3299 Terminal Multiplexers

## Determining a Terminal's Port Number

If a terminal is directly cabled to the 3174, its terminal port number is the same as the 3174 connector number. For example, if the terminal is cabled to 3174 connector 8, its terminal port number is 26-08.

If a terminal is cabled indirectly to a 3174 connector through a 3299, the terminal port number is determined by combining the numbers of the 3174 connector and of the 3299 connector. For example:

| 3174 Connector | + | 3299 Connector | = | Terminal Port Number |
|---|---|---|---|---|
| 0 | + | 0 | = | 26-00 |
| 0 | + | 4 | = | 26-04 |
| 8 | + | 0 | = | 26-08 |
| 8 | + | 4 | = | 26-12 |

## Completing the Worksheets

The 3174 cabling worksheets are in Appendix G. You can reproduce them in quantity, so you have an unused set available for future planning.

In addition to the 3174 cabling worksheets in Appendix G of this manual, you need additional worksheets for terminal cable attachment and connection to a host through a Token-Ring Network. Those worksheets are in the following manuals:

- *IBM Cabling System Planning and Installation Guide*
- *IBM Token-Ring Network Telephone Twisted-Pair Media Guide.*

Either the site planner or the customizing planner can fill out the cabling worksheets, but each probably needs to consult with the other to do it. Be sure to store a copy of the completed worksheets in the 3174.

Give the installer a copy of the completed worksheet from Appendix G and a copy of the cabling instructions from Appendix H.

There are three types of worksheets for the Models 51R, 52R, 53R, 61R, 62R, and 63R:

- 3299 Terminal Multiplexer
- 3174 to Terminal (Direct Connection)
- Concurrent Communication Adapter (Worksheets 11A and 11B).

You can connect terminals directly to the 3174 terminal adapter ports, to 3299 Terminal Multiplexers, or a combination of these. The following section describes three possible configurations.

## Worksheets (4A, 4B, and 5)

Fill out the cabling worksheet for Models 51R, 52R, 53R, 61R, 62R, and 63R as follows.

FROM 3174 TO 3299 TERMINAL MULTIPLEXER CABLING

| In this column: | Enter this information: |
|---|---|
| 3174 Connector (0 or 8) | Do not write anything in this column. This column lists the 3174 connector number that is printed next to the connector. |
| 3299 Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.<br><br>In this column, you write in the identification of the cable that physically attaches to each 3299. |
| 3299 Model | Write in the model number of the 3299 that you assign to each port. This number will be either 1, 2, or 3. |
| 3299 Location | Write a brief description of the 3299's physical location: building name or number, floor, and office number. |
| 3299 ID | Write a name or a number to identify the 3299. |

FROM 3299 TERMINAL MULTIPLEXER TO TERMINAL CABLING

| In this column: | Enter this information: |
|---|---|
| 3299 Connector | Do not write anything in this column. This column lists the connector numbers that are printed next to the connectors on the front of the 3299. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.<br><br>In this column, you write in the identification of the cable that physically attaches to each terminal. |
| Terminal Type | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3299 Model 2. |
| Terminal Location | Write a brief description of the terminal physical location: the building name or number, floor, and office number. |
| Terminal Port | Write the terminal port numbers associated within the range of this worksheet. |

FROM 3174 TO TERMINAL CABLING (DIRECT CONNECTION)

| In this column: | Enter this information: |
|---|---|
| 3174 Connector | Do not write anything in this column. This column lists the connector numbers that are printed next to the connectors on the 3174. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each connector. |
| Terminal Type. | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3299 Model 2. |
| Terminal Location | Write a brief description of the terminal physical location: the building name or number, floor, and office number. |
| Terminal Port | Write all available terminal port numbers. They are the same value as the connector numbers. |

# Models 81R, 82R, 91R, and 92R

The following sections describe the planning and terminal cable installation for Models 81R, 82R, 91R, and 92R.

## Defining the Subsystem Configuration

The subsystem configuration for each 3174 depends on the number of ports and types of terminal connectors on the 3174. The Models 81R, 82R, 91R, and 92R each have terminal adapters which consist of four connectors numbered from 0 to 3 as shown in Figure 4-15.
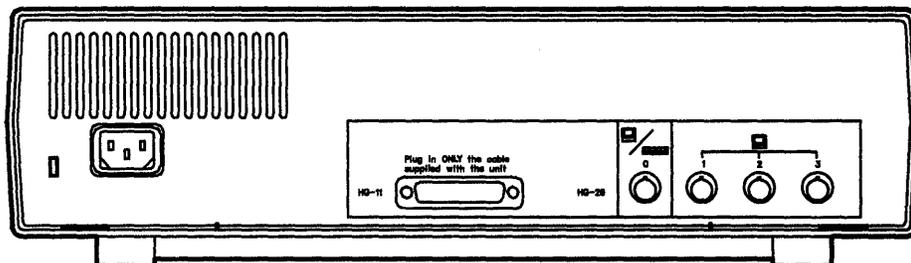
Figure 4-15. The Four Connectors on Models 81R, 82R, 91R, and 92R

To identify the port number of the terminal adapter to which a terminal (display station or printer) is cabled, you need to do the following:

- Identify the connector on the 3174 where the cabling originates.

- Identify whether the terminal is cabled *directly* to the 3174 connector or *indirectly* through a 3299 Model 1, 2, or 3.

  - If a terminal is cabled *directly* to a 3174 connector, the terminal port number is the same as the 3174 connector number.

  - If a terminal is cabled *indirectly* to a 3174 connector through a 3299, the terminal port number is determined by combining the numbers of the 3174 connector and of the 3299 connector.

### Using the Terminal Adapter

There are four connectors on the 3174 terminal adapter, numbered 0 to 3. Hardware group 26 has been assigned to the terminal adapter. All terminals that attach to these connectors, directly or indirectly, will use the number 26 as a prefix to their terminal port number (for example, terminal port 26-03).

The following are restrictions on the type of device that you can cable to particular 3174 connectors:

To connector 0, you can cable a display station or a 3299. If you cable a 3299 to connector 0, you cannot use connectors 1 – 3.

To connectors 1 – 3, you can cable a display station or a printer. If you cable a 3299 to connector 0. However, you cannot use connectors 1 – 3.

## Possible Configurations

**Attaching Terminals Directly to the Terminal Adapter:** If you want to connect your terminals directly to the terminal adapter, you can do so by connecting the terminals to terminal adapter connectors 0 through 3 as shown in Figure 4-16. You can connect as many as four terminals in this way.
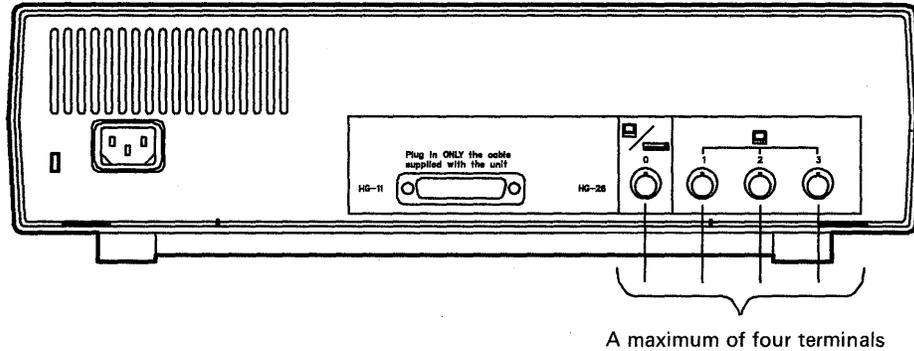
Figure 4-16. Models 81R, 82R, 91R, and 92R with Terminals Attached Directly to the Terminal Adapter

**Attaching One 3299 Terminal Multiplexer:** If you want to use one 3299 Terminal Multiplexer, you should connect it to terminal adapter connector 0 as shown in Figure 4-17. As many as eight terminals can then be connected to the 3299. This configuration then permits a maximum of eight terminals to be attached to your 3174. When a 3299 is attached to connector 0, connectors 1, 2, and 3 cannot be used.
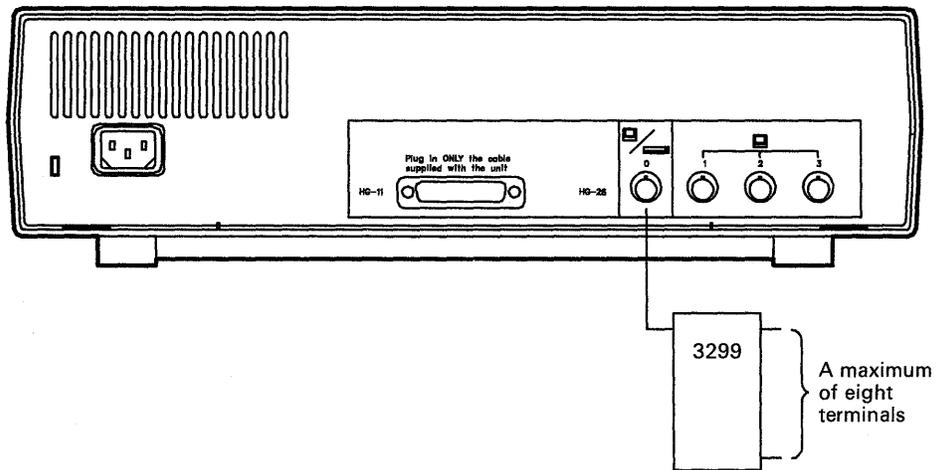
Figure 4-17. Models 81R, 82R, 91R, and 92R With One 3299 Terminal Multiplexer

## Determining a Terminal's Port Number

If a terminal is directly cabled to the 3174, its port number is the same as the 3174 connector number. For example, if the terminal is cabled to 3174 connector 3, its port number is 26-03.

| 3174 Connector | + | Terminal Port Number |
|---|---|---|
| 0 | = | 26-00 |
| 1 | = | 26-01 |
| 2 | = | 26-02 |
| 3 | = | 26-03 |

If a terminal is cabled indirectly to a 3174 connector through the 3299, the port number is determined by combining the numbers of the 3174 connector and of the 3299 connector. For example:

| 3174 Connector | + | 3299 Connector | = | Terminal Port Number |
|---|---|---|---|---|
| 0 | + | 0 | = | 26-00 |
| 0 | + | 1 | = | 26-01 |
| 0 | + | 2 | = | 26-02 |
| 0 | + | 3 | = | 26-03 |
| 0 | + | 4 | = | 26-04 |
| 0 | + | 5 | = | 26-05 |
| 0 | + | 6 | = | 26-06 |
| 0 | + | 7 | = | 26-07 |

## Completing the Worksheets

The 3174 cabling worksheets are in Appendix G. You may want to reproduce them in quantity so that you have an unused set available for future planning.

Either the site planner or the customizing planner can fill out the cabling worksheets, but each will probably need to consult with the other to do it. Be sure to store a copy of the completed worksheets in the 3174.

Give the installer a copy of the completed worksheets from Appendix G and a copy of the cabling instructions from Appendix H.

There are two types of worksheets for the Models 81R, 82R, 91R, and 92R:

- 3299 Terminal Multiplexer to Terminal
- 3174 to Terminal (Direct Connection).

You can connect terminals directly to the 3174 connectors, to 3299 Terminal Multiplexers, or a combination of these. The following sections describe two possible configurations.

## Worksheets 6 and 7

Fill out the cabling worksheet for Models 81R, 82R, 91R, and 92R as follows.

FROM 3174 TO 3299 TERMINAL MULTIPLEXER CABLING

| In this column: | Enter this information: |
|---|---|
| 3174 Connector | Do not write anything in this column. This column lists the 3174 connector number that is printed next to the connector. |
| 3299 Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each 3299. |
| 3299 Model | Write in the model number of the 3299 that you assign to each port. This number will be either 1, 2, or 3. |
| 3299 Location | Write a brief description of the 3299's physical location: building name or number, floor, and office number. |
| 3299 ID | Write a name or a number to identify the 3299. |

FROM 3299 TERMINAL MULTIPLEXER TO TERMINAL CABLING

| In this column: | Enter this information: |
|---|---|
| 3299 Connector | Do not write anything in this column. This column lists the connector numbers that are printed next to the connectors on the front of the 3299. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this column, you write in the identification of the cable that physically attaches to each terminal. |
| Terminal Type | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3299 Model 2. |
| Terminal Location | Write a brief description of the terminal physical location: the building name or number, floor, and office number. |
| Terminal Port | Write the terminal port numbers associated within the range of this worksheet. |

FROM 3174 TO TERMINAL CABLING (DIRECT CONNECTION)

| In this column: | Enter this information: |
| --- | --- |
| 3174 Connector | Do not write anything in this column. This column lists the connector numbers that are printed next to the connectors on the 3174. |
| Terminal Cable ID | Identify each cable in some way. For example, attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.<br><br>In this column, you write in the identification of the cable that physically attaches to each terminal adapter connector. |
| Terminal Type | Write in the type and model number of the terminal that you assign to each port, for example, 3287 Model 2C or 3299 Model 2. |
| Terminal Location | Write a brief description of the terminal physical location: the building name or number, floor, and office number. |
| Terminal Port | Write all available terminal port numbers. They are the same value as the connector numbers. |

# Using the AEA

The following section describes the planning and terminal cable installation for the AEA. The Asynchronous Emulation Adapter has eight connectors (see Figure 4-18) numbered from 0 to 7. Terminals are connected to the AEA through these connectors.
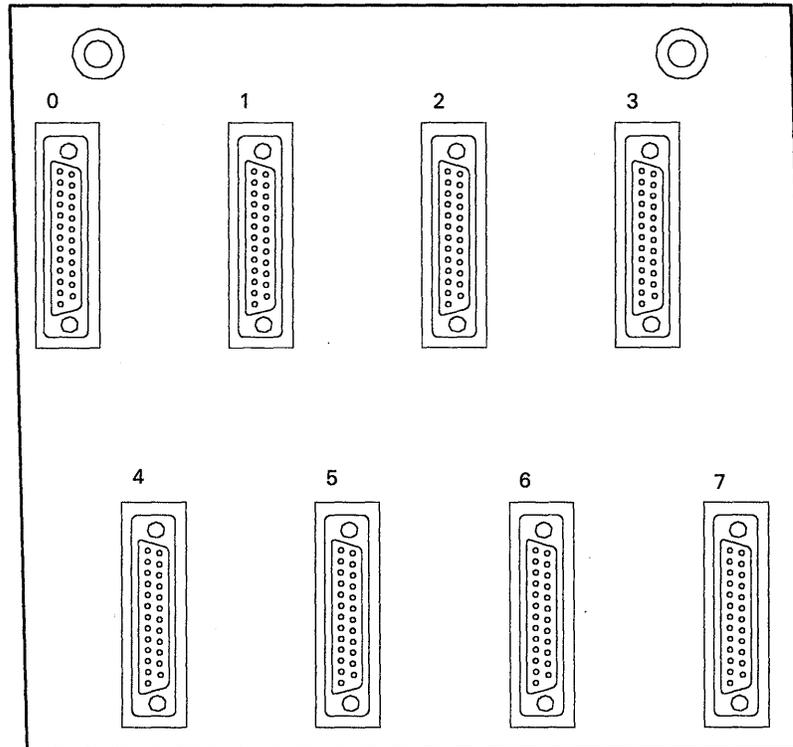


Figure 4-18. AEA Connectors on Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R. For an illustration of the AEA connectors on other models, see Figure 3-6 on page 3-15.

## Determining a Terminal's Port Number

To determine a terminal's port number on the AEA, you need to know the AEA prefix number and the number of the connector that the terminal connects to on the AEA. The prefix number for the first AEA is 21; the prefix for the second AEA is 22; and the prefix for the third AEA is 23. The connectors on the AEA are numbered 0 to 7. As an example of this, a terminal connected to connector 4 on the second AEA would have port number 22-04.

## Completing the Worksheets

The AEA cabling worksheets are in Appendix G. You can reproduce them in quantity so you have an unused set available for future planning.

Either the site planner or the customizing planner can fill out the cabling worksheets, but each probably needs to consult with the other to do it. Be sure to store a copy of the completed worksheets in the 3174.

Give the installer a copy of the completed worksheets from Appendix G and a copy of the cabling instructions from Appendix H.

### For Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R (Worksheets 8A – 8C)

The AEA is an optional feature in these models. Each of these models can have as many as three AEAs. Complete one cabling worksheet for each AEA in your 3174. For instance, if you have ordered two AEAs, you will probably want to use the AEA 8A cabling worksheet and AEA 8B cabling worksheet.

**Note:** The AEA feature cannot coexist with the IBM Token-Ring Network 3270 Gateway feature in 3174 Model 1L, 1R, 2R, 11L, 11R, 12R, 51R, 52R, 61R, or 62R.

Fill out the AEA cabling worksheet as follows. Refer to Appendix G for this worksheet.

| In this row: | Enter this information: |
|---|---|
| AEA (1 – 3) Connector | Do not write anything in this row. This row lists the numbers that are printed next to the connectors on the AEA. |
| Cable ID | Identify each cable in some way. Attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination. |
| | In this row, you write in the identification of the cable that physically attaches to each terminal, ASCII host, or modem. If you attached a total of eight terminals, hosts, and modems to the AEA, you should write in eight cable IDs. |
| Modem Type | Write in the code letter or type for the communication links that are assigned to each modem type. |
| | **DM**  for Nonswitched (dedicated-line) modems<br>**SM**  for Switched modems<br>**D**   for Direct Connection – no modem is used |
| Host or Terminal Types | Note the type of terminal or host that is connected to this line. |
| Host or Terminal Location | Write a brief description of the host or terminal's physical location: building name or number, floor, and office number. This will probably be blank for switched modem entries. |
| Dial In Phone Number | Enter the dial in phone number, if there is one. This will be used only with switched modem types. |
| | **Note:** This information is for record keeping only and is not needed for configuration. |

| **In this row:** | **Enter this information:** |
|---|---|
| Dial Out Phone Number | Enter the dial out phone number, if there is one. This will be used only with switched modem types. Additional numbers can also be entered here. |
| AEA Port | Do not write in this row. This row lists the port associated with each AEA connector. |

## For Models 51R, 52R, 53R, 61R, 62R, and 63R (Worksheet 9)

The AEA is an optional feature in 3174 Models 51R, 52R, 61R, 62R, or 63R. You can have one AEA installed. Complete the cabling worksheet for the AEA in your 3174.

**Note:** The AEA feature cannot coexist with the IBM Token-Ring Network 3270 Gateway feature in Models 51R, 52R, 61R, or 62R.

Fill out the AEA cabling worksheet as follows. You can find the worksheet in Appendix G.

| In this row: | Enter this Information: |
|---|---|
| AEA (1) Connector | Do not write anything in this row. This row lists the numbers that are printed next to the connectors on the AEA. |
| Cable ID | Identify each cable in some way. For example, you can choose to attach a label to each end of the cables and write on the label the cable's *To* and *From* locations. This helps the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.<br><br>In this row, you write in the identification of the cable that physically attaches to each terminal, ASCII host (not Primary), or modem. If you attached a total of eight terminals, hosts, and modems to the AEA, you would write in eight cable IDs. |
| Modem Type | Write in the code letter or type for the connectors that are assigned to each modem type:<br><br>**DM** for Nonswitched (dedicated-line) modems<br>**SM** for Switched modems<br>**D** for Direct Connection — no modem is used |
| Host or Terminal Type | Note the type of terminal or host that is connected to this line. |
| Host or Terminal Location | Write a brief description of the host or terminal's physical location: building name or number, floor, and office number. This will probably be blank for switched modem entries. |
| Dial In Phone Number | Enter the dial in phone number, if there is one. This will be used only with switched modem types. |
| Dial Out Phone Number | Enter the dial out phone number, if there is one. This will be used only with switched modem types. Additional numbers can be entered here. |
| AEA Port | Do not write in this row. This row lists the port associated with each AEA connector. |

# Using the Concurrent Communication Adapter

The following section describes the planning and cable installation for the Concurrent Communication Adapter. The Concurrent Communication Adapter has one 25-pin D connector (see Figure 4-19). You can connect a 3270 host to the 3174 through this connector.

Figure 4-19. The Concurrent Communication Adapter

## Determining the Hardware Group

The hardware group numbers for CCAs are 51 and 52. These numbers are assigned when the 3174 microcode is loaded. The hardware group assigned to a CCA depends on the slot in which the adapter is installed. Hardware group number 51 is assigned to the adapter in the slot with the lowest slot number. If you have a second CCA installed, it is assigned hardware group number 52.

If the adapter in the slot with the lowest number is removed and the 3174 microcode is reloaded, the remaining adapter is automatically assigned hardware group number 51.

## Completing the Worksheets

The CCA worksheets are in Appendix G. You can reproduce them in quantity so you have an unused set available for future planning.

Either the site planner or the customizing planner can fill out the cabling worksheets, but each probably needs to consult the other to do it. Be sure to store a copy of the completed worksheets in the 3174.

Give the installer copy of the completed worksheets from Appendix G and a copy of the cabling instructions from Appendix H.

## For Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R (Worksheets 10A and 10B)

The CCA feature is an optional feature in these models. Each of these models can have as many as two CCAs. Complete one cabling worksheet for each CCA in your 3174. For example, if you have ordered two CCAs, you should use CCA Worksheets 10A and 10B.

**Note:** In Models 1L, 1R, 2R, and 3R, the CCA and AEA features can be installed in slots 12, 13, and 14. If you have one AEA, it must be installed in slot 14. If you have a second AEA, it must be installed in slot 13. The CCA can be installed in any slot not occupied by an AEA.

Fill out the CCA cabling worksheet as follows. See Appendix G for this worksheet.

| In this column: | Enter this information: |
|---|---|
| Hardware Group | Write the hardware group number assigned to this CCA. See "Determining the Hardware Group" on page 4-34 for more information. |
| Adapter Type | Write the type of interface on the adapter. This entry will be **Type 9263** or **Type 9267**. |
| Host Location | Write a brief description of the host's physical location: building name or number, floor, and office number. This column will probably be blank for switched modem entries. |
| Host Protocol | Write the type of host that is connected to this line. |
| Host Cable ID | Identify each cable by attaching a label to each end that describes the cable's *To* and *From* locations. Write in the identification of the cable that physically attaches to the host or modem. |
| | These labels help the person who installs each cable. They can also be helpful later during relocation of the terminals and in problem determination. |
| Modem Type | Write in the code letter or type for the connectors that are assigned to each modem type: |
| | **DM**  for Nonswitched (dedicated-line) modems<br>**SM**  for Switched modems<br>**D**    for Direct Connection — no modem is used |
| Dial Out Phone Number | Enter the dial out phone number, if there is one. This number will be used only with switched modem types. Additional numbers can be entered here. |

## For Models 51R, 61R, 62R, and 63R (Worksheets 11A and 11B)

The CCA feature is an optional feature in these models. Models 61R and 62R can have two CCAs. Models 51R and 63R can each have one CCA. Complete one cabling worksheet for each CCA in your 3174. For example, if you have ordered two CCAs, you should use CCA Worksheets 11A and 11B.

Fill out the CCA cabling worksheet as follows. See Appendix G for this worksheet.

**In this column:**      **Enter this information:**

Hardware Group

Write the hardware group number assigned to this CCA. See "Determining the Hardware Group" on page 4-34 for more information.

Adapter Type

Write the type of interface on the adapter. This entry will be **Type 9263** or **Type 9267**.

Host Location

Write a brief description of the host's physical location: building name or number, floor, and office number. This column will probably be blank for switched modem entries.

Host Protocol

Write the type of host that is connected to this line.

Host Cable ID

Identify each cable by attaching a label to each end of the cable that describes the cable's *To* and *From* locations. Write in the identification of the cable that physically attaches to the host or modem.

These labels help the person who installs each cable. It can also be helpful later during relocation of the terminals and in problem determination.

Modem Type

Write in the code letter or type for the connectors that are assigned to modem type:

**DM**    for Nonswitched (dedicated-line) modems
**SM**    for Switched modems
**D**      for Direct Connection — no modem is used

Dial Out Phone Number

Enter the dial out phone number, if there is one. This number will be used only with switched modem types. Additional numbers can be entered here.

# Attaching Cables

The following sections describe how to attach cables to terminals, the AEA, and 3174.

## Attaching Terminal Cables

1. On Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R, open the door at the front of the 3174. On 3174 Models 51R, 52R, 53R, 61R, 62R, 63R, 81R, 82R, 91R, and 92R, connections are made at the back of the 3174.

   **CAUTION:**
   **Do not connect or disconnect terminal cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices*.)

2. Use a push-and-twist clockwise motion, as shown, to connect and lock the terminal connectors for BNC or DPC connectors to the port sockets.
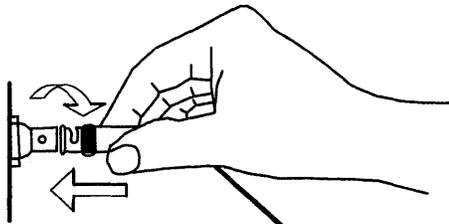


3. Store the appropriate 3174 cabling worksheets with the 3174 for future reference.

4. Close the door to the front of the 3174 on Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

See Figures 4-20 and 4-21 for examples of terminal cable connections using coaxial cable and IBM Cabling System media.
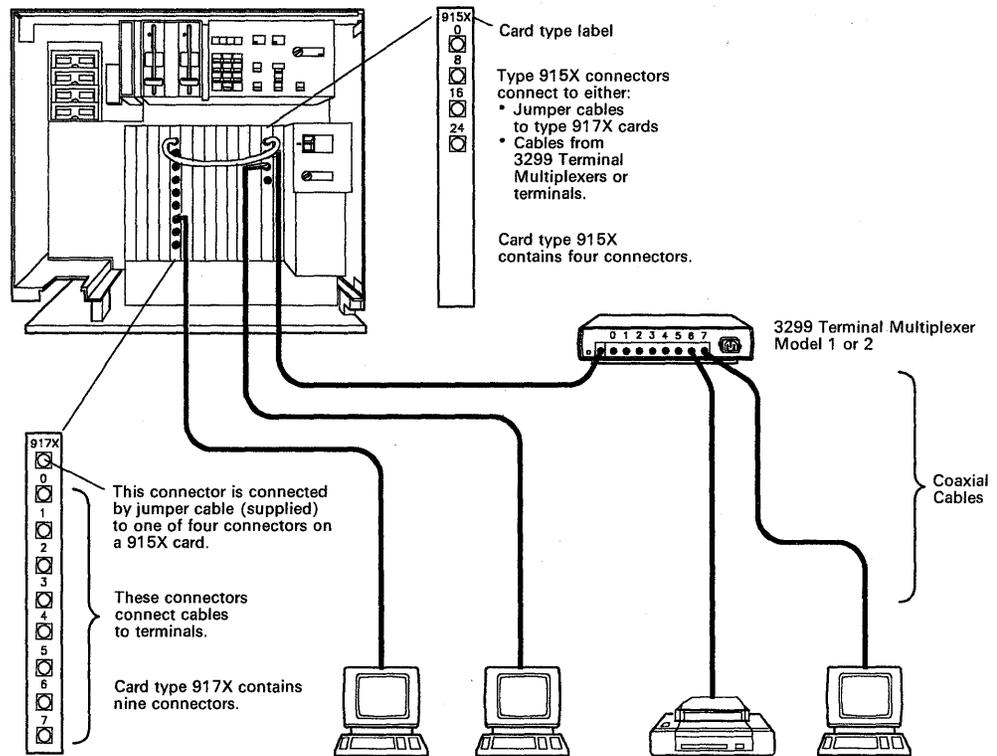
**915X**
0
8
16
24

Card type label

Type 915X connectors
connect to either:
* Jumper cables
  to type 917X cards
* Cables from
  3299 Terminal
  Multiplexers or
  terminals.

Card type 915X
contains four connectors.

**917X**
0
1
2
3
4
5
6
7

This connector is connected
by jumper cable (supplied)
to one of four connectors on
a 915X card.

These connectors
connect cables
to terminals.

Card type 917X contains
nine connectors.

3299 Terminal Multiplexer
Model 1 or 2

0 1 2 3 4 5 6 7

Coaxial
Cables

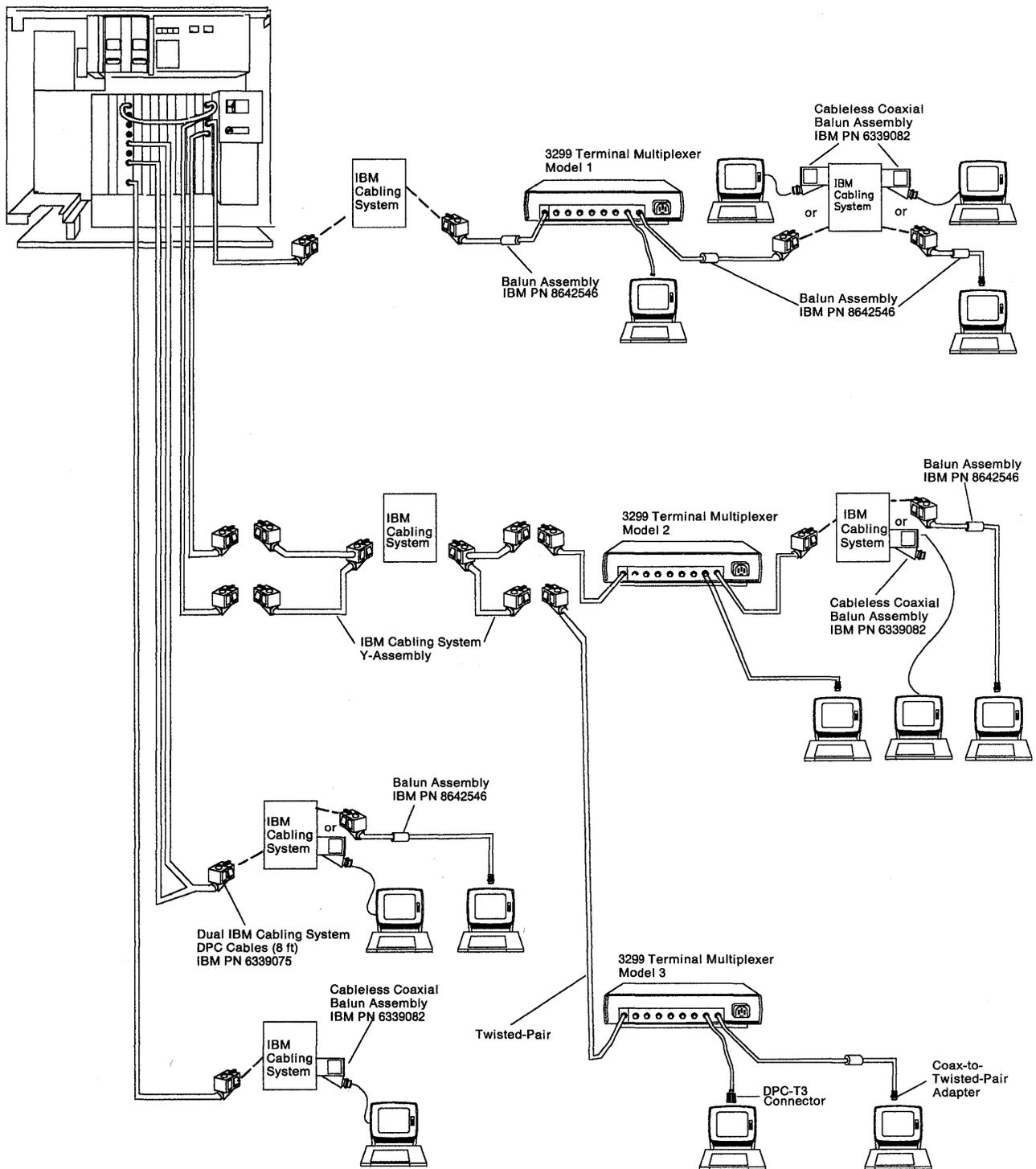Figure   4-20.  3174 Terminal Cable Connections Using Coaxial Cable

Figure 4-21. 3174 Terminal Cable Connections Using IBM Cabling System Media

## Attaching AEA Cables

On 3174 Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 51R, 52R, 61R, 62R, and 63R, the AEA cables are attached at the back of the 3174. To attach the cables, follow these steps:

1. Attach the cable plug to the appropriate 25-pin D connector on the AEA panel on the back of the 3174. Push to seat the plug.

2. Tighten the thumbscrews securely by turning them clockwise.

3. Connect the other end of the cable in the same manner to the desired host, modem, or terminal.

4. Store the appropriate cabling worksheets in the 3174.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices* .)

## Attaching CCA Cables

On 3174 Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, 13R, 51R, 61R, 62R, and 63R, the CCA cable is attached at the back of the 3174. To attach the cable, follow these steps:

1. Attach the cable plug to the 25-pin D connector on the CCA on the 3174. The connector for the CCA is on the front of Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R and on the back of Models 51R, 61R, 62R, and 63R. Push to seat the plug.

2. Tighten the thumbscrews securely by turning them clockwise.

3. Connect the other end of the cable in the same manner to the desired host or modem.

4. Store the appropriate cabling worksheets in the 3174.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices* .)

## Attaching Other 3174 Communication Cables

This section describes how to attach the following cables:

- EIA 232D cable
- X.21 cable
- CCITT V.35 Interface cable
- Token-Ring Network cable.

## EIA 232D Cable

**Part Number:** 6423153/4 or 39F7858/961. (For Japan and Korea, 73X3722/3 or 25F8492/39F7966. For Germany, 25F7432/3 or 39F7967/5.)

For a 3174 attached to a switched or nonswitched DCE or direct-attachment host:

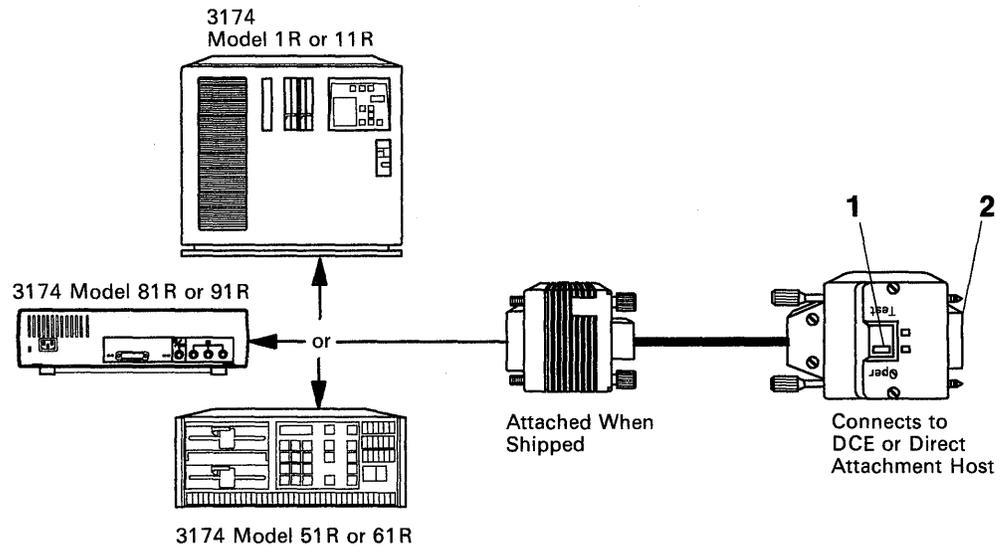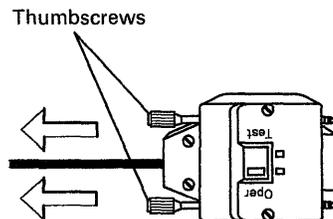1. Set the TEST/OPER switch **1** to the OPER position. (See Figure 4-22.)



Figure 4-22. An EIA 232D Cable Connection

**Only users in Japan, Germany, and Korea** should continue with Step 2.
**Users other than those in Japan, Germany, or Korea** should go to Step 3.

2. **Users in Japan, Germany, and Korea:** The thumbscrews on the communication cable shipped to you are made with inch threads and are not attachable to Nippon Telephone and Telegraph (NTT) modems or their equivalents. They are for use with IBM modems or other modems using an English-unit connector. Replace the thumbscrews with the metric thumbscrews provided in the customer envelope for NTT modems as follows:

   a. Remove the thumbscrews by pulling them away from the plug. Do not be afraid to apply the necessary force.

b. Insert the thumbscrews provided in the customer envelope by pushing them in the reverse direction of the arrows until the end of each thumbscrew appears outside the hood.

**Note:** Keep the removed thumbscrews in the customer envelope for later use.

Continue with Step 3.

3. Connect plug **2** to the data circuit-terminating equipment (DCE).

## X.21 Cable

**Part Number:** 6168155/6

For a 3174 attached to an X.21 termination or to a direct-attachment host:

1. Set the TEST/OPER switch **1** to the OPER position. (See Figure 4-23.)

   **Only users in Japan, Germany, and Korea** should continue with Step 2.
   **Users other than those in Japan, Germany, or Korea** should go to Step 3.

2. **Users in Japan, Germany, and Korea:** Replace the thumbscrews with those provided in the customer envelope for NTT modems as follows:

   a. Remove the thumbscrews by pulling them away from the plug. Do not be afraid to apply the necessary force.

   b. Insert the metric thumbscrews provided in the customer envelope by pushing them in the reverse direction of the arrows until the end of each thumbscrew appears outside the hood.

   **Note:** Keep the removed thumbscrews in the customer envelope for later use in case the modem is changed.

   Continue with Step 3.

3. Connect the cable plug **3** to the modem.

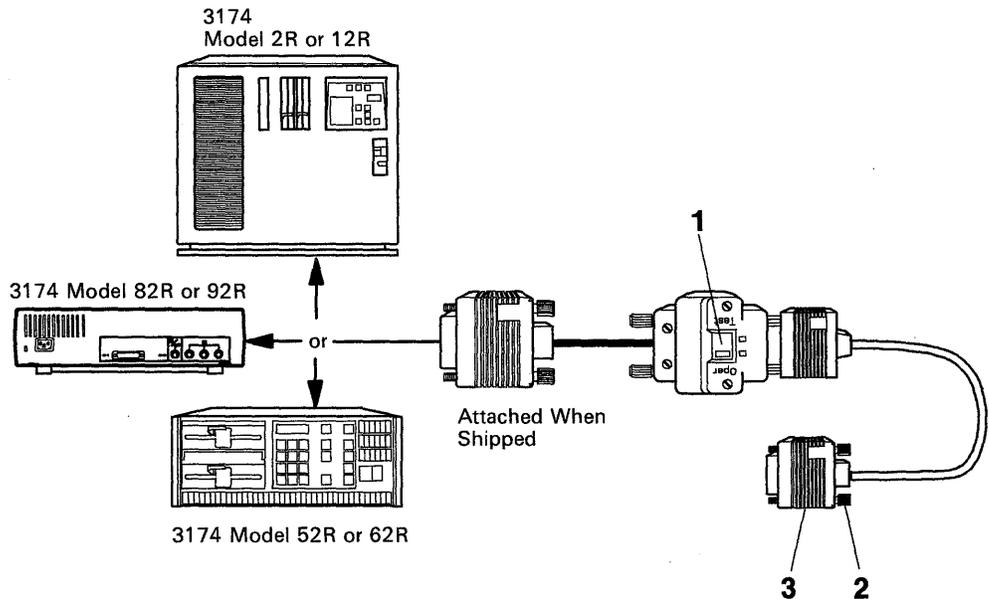4. Tighten the thumbscrews **2** of the cable plug **3** securely with your fingers.



Figure 4-23. An X.21 Cable Connection

## CCITT V.35 Interface Cable

**Part Number:** 6423325/7 or 25F8490/39F7963. (For France and Switzerland, 6423326/8 or 25F8491/39F7964.)

For a 3174 using the CCITT V.35 interface:

1. Set the TEST/OPER switches **1** to the OPER position. (See Figure 4-24.)

2. Connect the cable plug **3** to the V.35 DCE.

3. Tighten the thumbscrews **2** of the cable plug securely with your fingers.
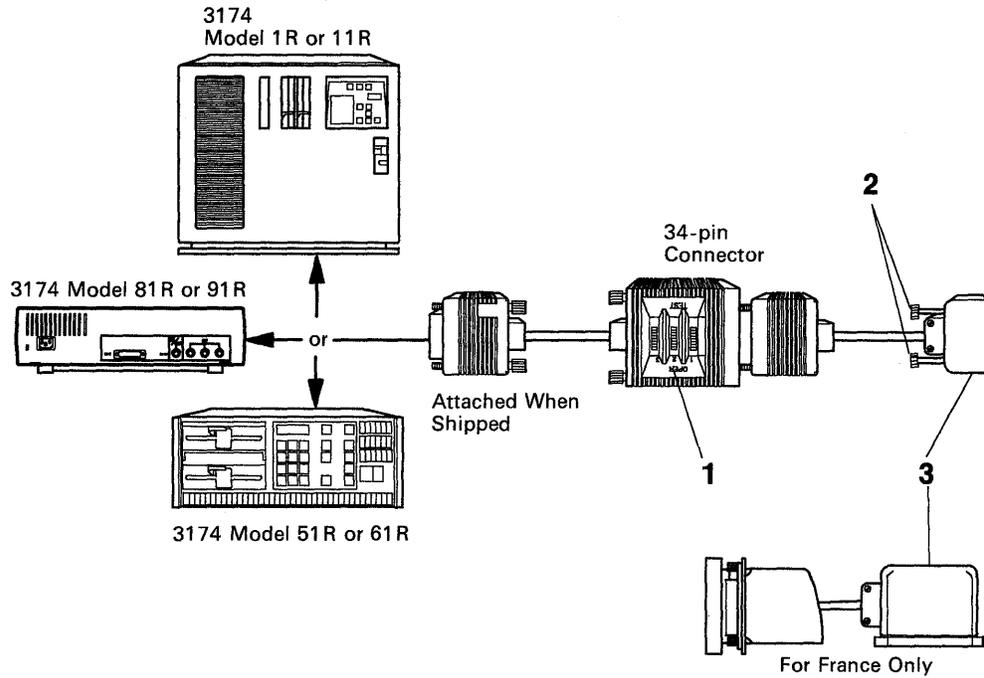


Figure 4-24. A CCITT V.35 Cable Connection

## Token-Ring Network Cable

**Part Number:** 6165837

For a 3174 Model 3R, 53R, 13R, or 63R connected to an IBM Token-Ring Network network and for Models 1L, 1R, 3R, 11L, 13R, 51R, 52R, 53R, 61R, 62R, or 63R with the IBM Token-Ring Network 3270 Gateway feature:

1. Attach the cable plug **1** to the 9-pin connector on the IBM Token-Ring adapter card.

2. Tighten the thumbscrews **2** securely by turning them clockwise.

3. Connect the IBM Cabling System connector **3** to the cabling system wall outlet, which connects to the IBM 8228 Multistation Access Unit.

**Note:** A similar cable, called a Type 3 Media Filter, is also available. This case uses telephone twisted-pair media and a miniature 6-pin modular jack. The Type 3 Media filter (IBM Specification 6466941) is not available from IBM. Consult your IBM representative for a list of suppliers of this cable. Refer to the *IBM Token-Ring Network Telephone Twisted-Pair Media Guide* for additional information.
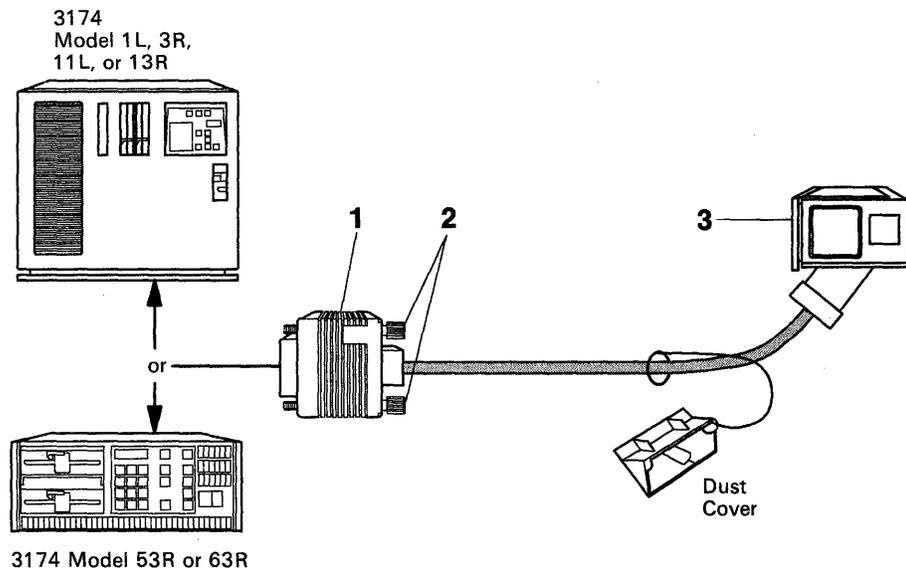


Figure 4-25. A Token-Ring Network Adapter Cable Connection

# Chapter 5.  Machine Specifications

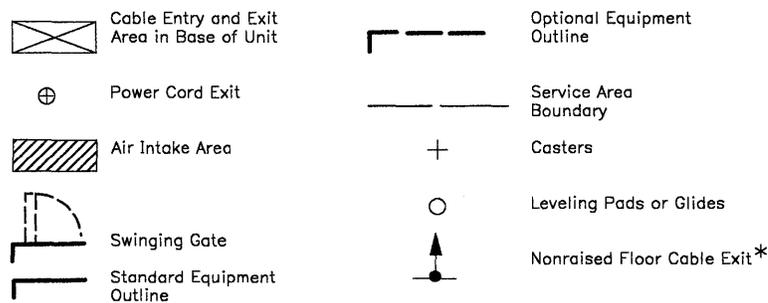This chapter contains the machine specifications for the following:

*   Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R
*   Models 51R, 52R, 53R, 61R, 62R, and 63R
*   Models 81R, 82R, 91R, and 92R
*   3299 Terminal Multiplexer Models 1, 2, and 3.

The specifications for each machine include the following:

*   A plan view
*   A drawing
*   Functional clearances
*   Dimensions
*   Service clearances
*   Weight

*   Heat output
*   Airflow
*   Power requirements
*   Power cord information
*   Plug type
*   Nominal operating voltages.

Machine specifications for other units in the IBM 3270 Information Display System are contained in manuals listed under "Related Publications" in the preface.

Figure 5-1 shows the symbols used in the plan views. In the plan views and specifications, metric units are rounded to the nearest 5 millimeters, and English units are rounded to the nearest 1/4 inch where fractions are used. See Appendix C for inch-to-millimeter conversions.

Cable Entry and Exit Area in Base of Unit

Power Cord Exit

Air Intake Area

Swinging Gate

Standard Equipment Outline

Optional Equipment Outline

Service Area Boundary

Casters

Leveling Pads or Glides

Nonraised Floor Cable Exit*

* For table- or counter-top terminals, the space between the bottom of the terminal and the surface of the table or of the counter permits signal cable and power cords to enter and exit from any direction. Thus, cutouts in table or counter are not necessary.
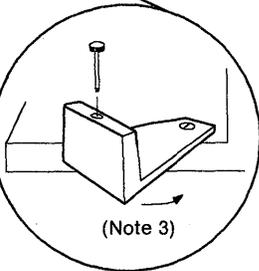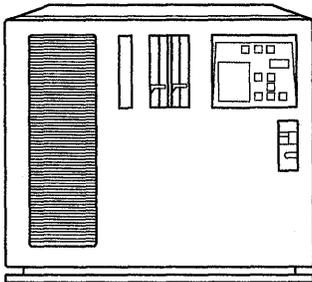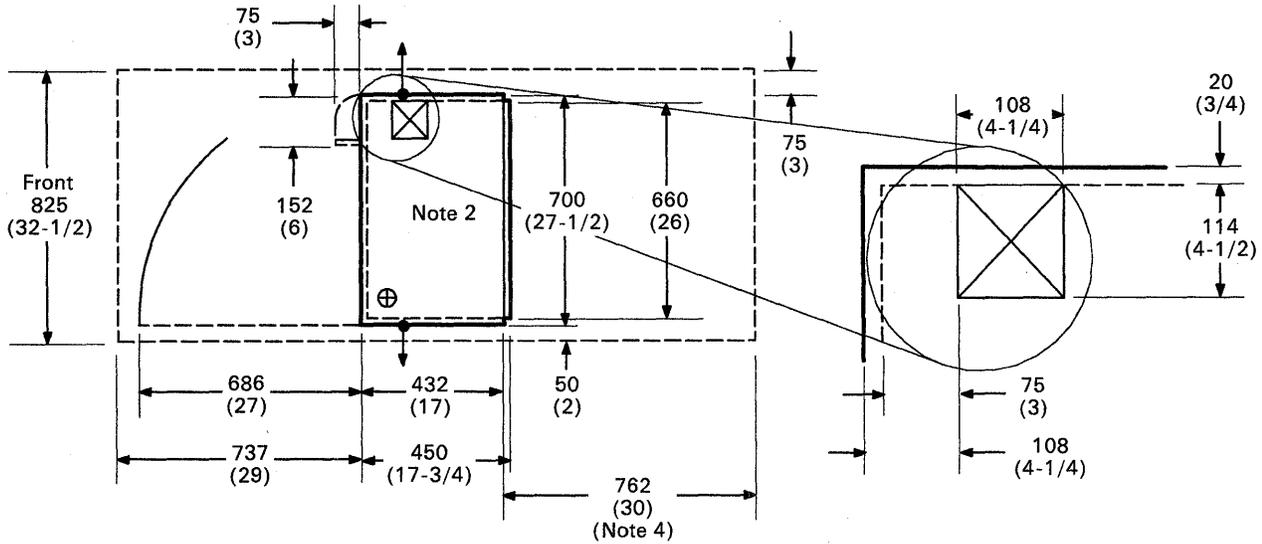
Figure   5-1. Symbols Used in Plan Views

# Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

## Plan View

Scale: 40 mm (1.6 in) = 1 m (39.4 in)
(Dimensions are shown in millimeters, with inches in parentheses.)

## Unit Functional Clearances

|       | mm  | (in) |
|-------|-----|------|
| Front | 712 | (28) |
| Rear  | 0   | (0)  |
| Right | 50  | (2)  |
| Left  | 0   | (0)  |
| Top   | 0   | (0)  |

**Notes:**

1. Dimensions are minimum requirements for functional operation of the machine. These dimensions allow sufficient airflow to provide cooling.
2. If the unit is installed with minimum clearance, service access must be provided.
3. The 3174 has a pedestal base that provides sufficient space for cables to exit on all sides.
4. Removing the corner thumbscrew allows the support wedge to swing out (as indicated in the plan view) for ease of channel cable installation. Service clearance must be provided.
5. The rear service clearance can be reduced to zero without the AEA.

## Specifications

**Dimensions:**

|       | F        | S    | H    |
|-------|----------|------|------|
| mm    | 700      | 460  | 635  |
| (inches) | (27-1/2) | (18) | (25) |

**Service Clearances:**

|       | F    | L   | Rt  | R    | T   |
|-------|------|-----|-----|------|-----|
| mm    | 737  | 75  | 50  | 762  | 0   |
| (inches) | (29) | (3) | (2) | (30) | (0) |

**Weight:** 50 kg (110 lb)

| **Heat Output:** 400 watts (1365 BTU/hr)

**Airflow:**

Models 1L, 1R, 2R, and 3R            2.8m³/min (100 cfm) forced air

Models 11L, 11R, 12R, and 13R        2.4m³/min (85 cfm) forced air

**Power Requirements:**

| kVA       | 0.66                |
| Phases    | 1                   |
| Voltage   | See Table 5-1 below. |

**Power Cord:** Detachable, 3-conductor

**Power Cord Length:** The standard length for the power cord is 4.3 m (14 ft). An optional length of 1.8 m (6 ft) is available in the U.S. only.

**Plug Type:** See Appendix A (U.S. and Canada) or Appendix B (Americas/Far East and Europe/Middle East/Africa).

**Acoustical Data:** See Appendix E.

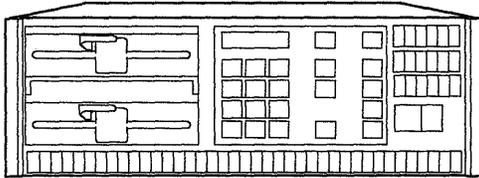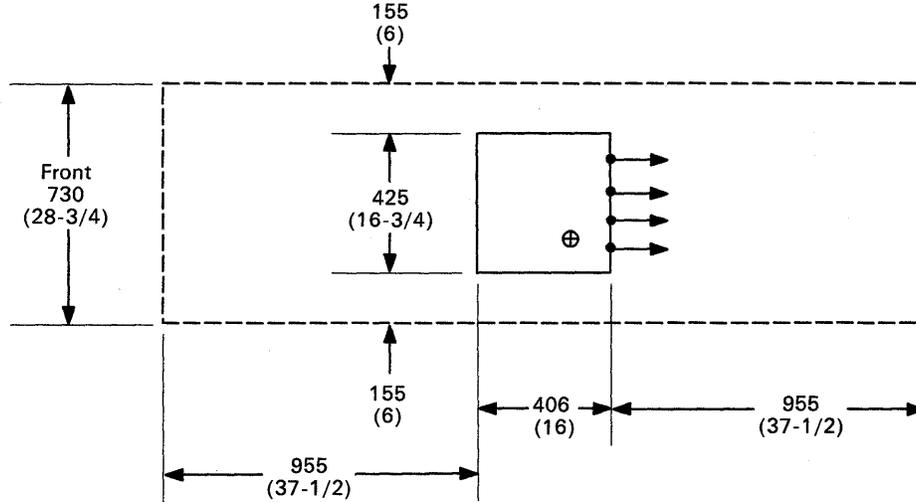| Table 5-1. Nominal Operating Voltages for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R | | | | |
|---|---|---|---|---|
|  | **100 to 127 V 50 or 60 Hz** | | **200 to 240 V 50 or 60 Hz** | |
|  | **Local** | **Remote** | **Local** | **Remote** |
| U.S. and Canada | X | X | X |  |
| Americas/Far East | X | X | X | X |
| Europe/Middle East/Africa |  |  | X | X |
| Saudi Arabia | X | X |  |  |

# Models 51R, 52R, 53R, 61R, 62R, and 63R

## Plan View

Scale: 40 mm (1.6 in) = 1 m (39.4 in)
(Dimensions are shown in millimeters, with inches in parentheses.)



## Unit Functional Clearances

|       | mm  | (in.)     |
|-------|-----|-----------|
| Front | 750 | (29-1/2)  |
| Rear  | 100 | (4)       |
| Right | 0   | (0)       |
| Left  | 0   | (0)       |
| Top   | 25  | (1)       |

**Notes:**

1. Dimensions are minimum requirements for functional operation of the machine. These dimensions allow sufficient airflow to provide cooling.
2. If the unit is installed with minimum clearance, service access must be provided.
3. Models 51R, 52R, 53R, 61R, 62R, and 63R can be mounted on a shelf in a standard 483-mm (19-in.) rack.

## Specifications

**Dimensions:**

|  | F | S | H |
|---|---|---|---|
| mm | 445 | 508 | 200 |
| (inches) | (17-1/2) | (20) | (7-7/8) |

**Service Clearances:**

|  | F | L | Rt | R | T |
|---|---|---|---|---|---|
| mm | 955 | 155 | 155 | 955 | 250 |
| (inches) | (37-1/2) | (6) | (6) | (37-1/2) | (10) |

**Weight:** 22.7 kg (50 lb)

| **Heat Output:** 200 watts (682 BTU/hr)

**Airflow:**

| Models 51R, 52R, and 53R | 1.4 m$^3$/min (50 cfm) forced air |
|---|---|
| Models 61R, 62R, and 63R | 0.85m$^3$/min (30 cfm) forced air |

**Power Requirements:**

| | kVA | 0.34 |
|---|---|
| Phases | 1 |
| Voltage | See Table 5-2 below. |

**Power Cord:** Detachable, 3-conductor

**Power Cord Length:** The standard length for the power cord is 4.3 m (14 ft).

An optional length of 1.8 m (6 ft) is available in the U.S. only.

**Plug Type:** See Appendix A (U.S. and Canada) or Appendix B (Americas/Far East and Europe/Middle East/Africa).
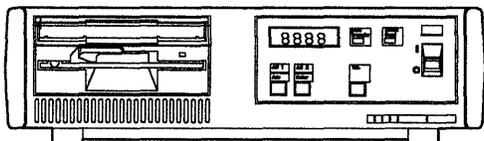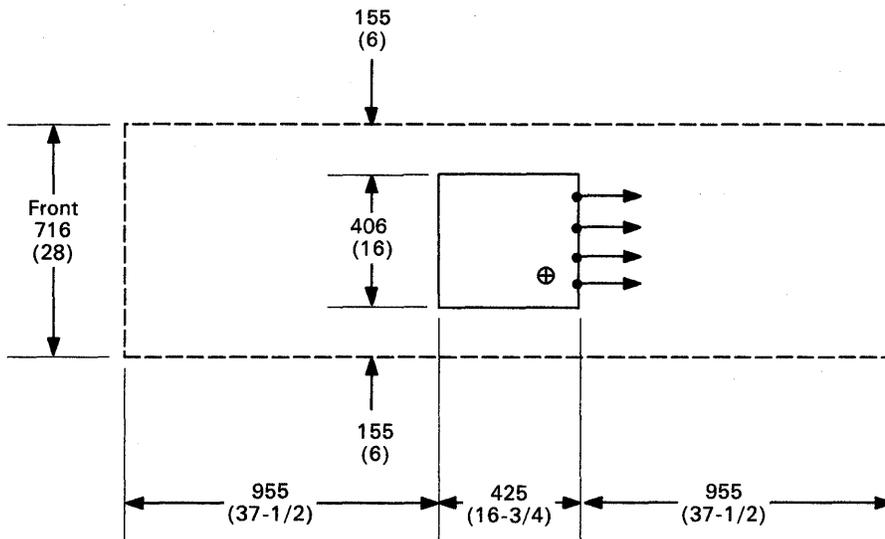
**Acoustical Data:** See Appendix E.

| Table 5-2. Nominal Operating Voltages for Models 51R, 52R, 53R, 61R, 62R, and 63R | 100 to 127 V 50 or 60 Hz | 200 to 240 Hz 50 or 60 Hz |
|---|---|---|
| U.S. and Canada | X | |
| Americas/Far East | X | X |
| Europe/Middle East/Africa | X | X |
| Saudi Arabia | X | |

# Models 81R, 82R, 91R, and 92R

## Plan View

Scale: 40 mm (1.6 in) = 1 m (39.4 in)
(Dimensions are shown in millimeters, with inches in parentheses.)



## Unit Functional Clearances

|       | mm  | (in.)    |
|-------|-----|----------|
| Front | 750 | (29-1/2) |
| Rear  | 155 | (6)      |
| Right | 76  | (3)      |
| Left  | 76  | (3)      |
| Top   | 30  | (1-1/4)  |

**Notes:**

1. Dimensions are minimum requirements for functional operation of the machine. These dimensions allow sufficient airflow to provide cooling.
2. If the unit is installed with minimum clearance, service access must be provided.
3. Models 81R, 82R, 91R, and 92R can be mounted on a shelf in a standard 483-mm (19-in.) rack.

## Specifications

**Dimensions:**

|       | F     | S        | H       |
|-------|-------|----------|---------|
| mm    | 406   | 425      | 120     |
| (inches) | (16) | (16-3/4) | (4-3/4) |

**Service Clearances:**

|       | F      | L   | Rt  | R      | T    |
|-------|--------|-----|-----|--------|------|
| mm    | 955    | 155 | 155 | 955    | 250  |
| (inches) | (37-1/2) | (6) | (6) | (37-1/2) | (10) |

**Weight:** 8.0 kg (18 lb)

| **Heat Output:** 85 watts (290 BTU/hr)

**Airflow:**

| Models 81R and 82R | 0.14 m³/min (5 cfm) forced air |
| Models 91R and 92R | 0.21m³/min (7.5 cfm) forced air |

**Power Requirements:**

| kVA     | 0.14 |
| Phases  | 1 |
| Voltage | See Table 5-3 below. |

**Power Cord:** Detachable, 3-conductor

**Power Cord Length:** The standard length for the power cord is 4.3 m (14 ft).

An optional length of 1.8 m (6 ft) is available in the U.S. only.

**Plug Type:** See Appendix A (U.S. and Canada) or Appendix B (Americas/Far East and Europe/Middle East/Africa).

**Acoustical Data:** See Appendix E.

Table 5-3. Nominal Operating Voltages for Models 81R, 82R, 91R, and 92R

|                            | 100 to 127 V 50 or 60 Hz | 200 to 240 Hz 50 or 60 Hz |
|----------------------------|--------------------------|---------------------------|
| U.S. and Canada            | X                        |                           |
| Americas/Far East          | X                        | X                         |
| Europe/Middle East/Africa  | X                        | X                         |
| Saudi Arabia               | X                        |                           |

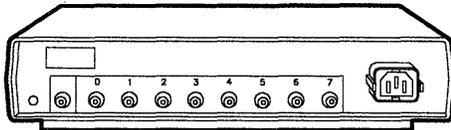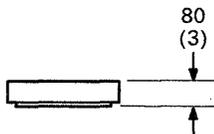# 3299 Terminal Multiplexer Models 1, 2, and 3 (Customer Setup Designated)
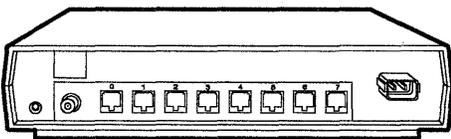
## Plan View

Scale: 40 mm (1.6 in) = 1 m (39.4 in)
(Dimensions are shown in millimeters, with inches in parentheses.)

337
(13-1/4)

191
(7-1/2)

Cable
Connector
Ports

Front

80
(3)
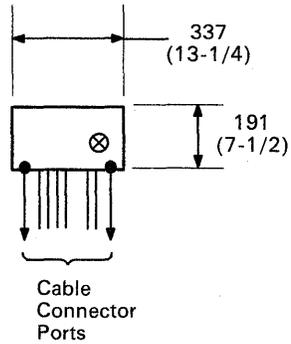
Models 1 and 2

Model 3 (U.S. and Canada only)

## Unit Functional Clearances

|       | mm  | (in.) |
|-------|-----|-------|
| Front | 100 | (4)   |
| Rear  | 25  | (1)   |
| Right | 25  | (1)   |
| Left  | 25  | (1)   |
| Top   | 25  | (1)   |

**Notes:**

1. Dimensions are minimum requirements for functional operation of the machine. These dimensions allow sufficient airflow to provide cooling.
2. The unit functional clearances supplied here do not apply when the 3299 is used with the rack accessory.
3. The 3299 Models 2 and 3 do not require a balun when attaching to the IBM Cabling System type 1, 2, and 9 media.
4. The 3299 Model 3 is the same as Models 1 and 2 except that cable connectors 0 through 7 are miniature 6-pin modular jacks that connect to IBM Cabling System type 3 media (telephone twisted-pair) without a coax-to-twisted-pair adapter.
5. The 3299 Model 3 is available in the U.S. and Canada only.
6. The 3299 Model 1 is no longer manufactured.

# Specifications

**Dimensions:**

|          | **F**     | **S**     | **H** |
|----------|-----------|-----------|-------|
| mm       | 337       | 191       | 80    |
| (inches) | (13-3/4)  | (7-1/2)   | (3)   |

**Weight:** 2.27 kg (5.0 lb)

**Heat Output:** 12 watts (41 BTU/hr)

**Airflow:** Natural convection

**Power Requirements:**

| kVA     | 100 − 127 V  0.012          |
|---------|-----------------------------|
|         | 200 − 240 V  0.013 − 0.026  |
| Phases  | 1                           |
| Voltage | See Table 5-4 below.        |

**Power Cord:** Detachable, 3-conductor.

**Power Cord Length:** 1.8 m (6 ft)

**Plug Type**: See Appendix A (U.S. and Canada) or Appendix B (Americas/Far East and Europe/Middle East/Africa).

**Acoustical Data:** See Appendix E.

**Accessories:** 483 mm (19-inch) rack-mounting shelf (part 6217036).

| Table 5-4. Nominal Operating Voltages for 3299 Terminal Multiplexer Models 1, 2, and 3 | | |
|---|---|---|
|  | **100 to 127 V**<br>**50 or 60 Hz** | **200 to 240 Hz**<br>**50 or 60 Hz** |
| U.S. and Canada | X |  |
| Americas/Far East | X | X |
| Europe/Middle East/Africa | X | X |
| Saudi Arabia | X |  |

# Chapter 6. Environmental and Safety Planning

This chapter describes environmental requirements regarding temperature, humidity, contamination, electricity, electromagnetic compatibility, and electrostatic discharge for the 3174.

## Temperature and Humidity

General hardware environmental limits for temperature and humidity are shown in Table 6-1. When subjected to extreme environmental conditions, all terminals of the 3174 subsystem should be allowed to stabilize in the operating environment for a reasonable period of time before being turned on.

Some terminals and recording media require special consideration and may have restrictive requirements. Refer to the machine specifications for each terminal for individual requirements.

| Table 6-1. Temperature and Humidity Requirements for the 3174 |
|---|
| **Environment, Operating:** |
| Temperature    10.0° to 40.6°C[1] (50° to 105°F)<br>Rel Humidity    8% to 80%[2]<br>Max Wet Bulb    26.7°C[3] (80°F) |
| **Environment, Nonoperating:** |
| Temperature    10.0° to 51.7°C[1] (50° to 125°F)<br>Rel Humidity    8% to 80%<br>Max Wet Bulb    26.7°C[3] (80°F) |
| **Environment, Storage:** |
| Temperature    0.6° to 60.0°C (33° to 140°F)<br>Rel Humidity    5% to 80%<br>Max Wet Bulb    29.4°C (85°F) |
| **Environment, Shipping:** |
| Temperature    -40.0° to 60.0°C (-40° to 140 °F)<br>Rel Humidity    5% to 100% (including condensation, excluding rain)<br>Max Wet Bulb    29.4°C (85°F) |

[1] The upper limit of air temperature should be reduced by 0.6°C (1°F) for every 76 m (250 ft) of elevation above 914 m (3000 ft).

[2] The lower limit of relative humidity for paper-handling is 20%.

[3] The upper limit of wet-bulb temperature should be reduced by 0.6°C (1°F) per 30.5 m (100 ft) of elevation above 305 m (1000 ft).

# Contamination

In some locations, airborne particles, vapors, or gases may subject 3174s and terminals to contamination. If you suspect contamination, contact the IBM installation planning representative during the early planning stages before installing or relocating any 3174s or terminals.

# Electrical Requirements

The following sections describe the electrical requirements of the 3174.

## Voltage and Frequency

A 3174 operates at 50 or 60 Hz with an allowable frequency variation of $\pm1$ Hz. The machine specification pages in Chapter 5, "Machine Specifications," list the single-phase voltage at which the individual 3174s and terminals operate. These units can withstand a transient voltage condition of $+15\%$ or $-18\%$ of nominal, if the input voltage returns to within a steady-state tolerance of $+10\%$ or $-8\%$ of the normal rated voltage within 30 cycles.

The allowable voltages are shown in Appendix D, "Voltage Limitations."

## Power Cords and Receptacles

Class I machines have power cords that include an equipment ground wire (green or green/yellow). Class II machines are double-insulated and do not require an equipment ground. Therefore, the power cords do not have a ground wire.

Appendix A identifies the plugs supplied in the U.S. and Canada. Appendix B identifies the plugs supplied in World Trade countries (Europe/Middle East/Africa and Americas/Far East), except Canada.

**CAUTION:**
**The power plug must be connected to a properly wired and grounded receptacle. An improperly wired receptacle could place a hazardous voltage on accessible metal parts of machines.** (For translations, see Safety Notice 6 in *IBM 3174 Safety Notices*.)

## Branch Circuits and Grounding

The individual branch circuits should have suitable circuit protection in accordance with national and local electrical codes. Each protector should be labeled to identify the branch circuit that it is controlling.

The power cords are equipped with a green or green and yellow wire. This conductor must be grounded back to earth or another suitable building ground. A dedicated insulated wire conductor is recommended for this purpose; however, a continuous metal conduit may be used if the conduit does the following:

* Has a permanent and continuous low-impedance path to ground to ensure electrical continuity

* Has the capacity to safely conduct any fault current likely to be imposed on it

* Facilitates the operation of the circuit protection device in the circuit.

Refer to *IBM Installation Manual — Physical Planning General Information* for the correct wiring of a typical power distribution system.

## Lightning Protection

You should install lightning protection on your secondary power source when the following occurs:

* The utility company installs lightning protectors on the primary power source.
* The area is subject to electrical storms or equivalent power surges.

Make sure that lightning protection is provided on the common-carrier lines. On signal lines, you are responsible for selecting the lightning protector and installing it properly.

---

# Electromagnetic Compatibility

In some instances, the site chosen for an installation may have ambient electromagnetic fields. These fields can result from nearby radio-frequency sources, such as transmitting antennas (AM, FM, television, and two-way radios), radar installations, and industrial equipment (radio-frequency induction heaters, arc welders, and insulation testers). Power distribution lines can generate magnetic fields that can cause display problems. As a precautionary measure, keep displays at least 1 m (3.3 ft) from such sources as power distribution lines and other sources of magnetic interference.

Other sources of interference are transformers (including those installed within other units), distribution panels, rotating machinery, fluorescent light fixtures, and electric floor heating. To identify the location of such sources of interference, check with your building engineer.

Before you position 3174s or cabling, an installation planning review may be appropriate to assess the environment and to determine whether any special installation or product considerations are required to ensure normal system operation and maintenance. Consult your IBM representative for more information.

# Electrostatic Discharge

Electrostatic charges can build up on people and furniture as a result of the following:

- Movement of personnel, carts, or furniture in contact with floor covering
- Personnel in contact with furniture coverings, like plastic seat covers.

Discharge of these static charges to the metal parts of the 3174 or to the furniture on which it is situated may cause interference with the operation of electronic equipment. These discharges may also cause personal discomfort.

Major factors that contribute to this problem include the following:

- High-resistance floor surface material
- Carpeting without antistatic properties
- Plastic seat covering
- Very low humidity (usually less than 20%)
- Metal frame furniture.

If any of the above factors are present at your site, review the facility with your IBM representative.

# Product and Environmental Safety

Safety is a major consideration in the design of IBM products. Environmental safety is your responsibility. Take care regarding placement of 3174s and terminals within your installation.

IBM 3174 controllers are not designed to be stacked. IBM does not recommend stacking 3174s as it could pose unsafe conditions for operating and service personnel. If you choose to stack 3174s you do so at your own risk and assume all responsibility for any injury, either personal or property, which results. IBM assumes no responsibility whatsoever for injury to person or property resulting from stacking controllers.

If you choose to mount 3174s in a rack, you are responsible for ensuring that each 3174 is secured to the rack, that the rack is secured to the building, that all operating, functional, and service clearances are met, and that there are no potential safety hazards to service personnel.

You should also consider the following safety factors:

- Emergency disconnection of power to the branch circuits serving the 3174s and terminals

- Clearances for both operating and service personnel (see the machine specification pages in Chapter 5, "Machine Specifications," for recommended clearances)

- Access clearance for each terminal

- Grounding of branch circuits as described under "Branch Circuits and Grounding" on page 6-3

- Lightning protection for power and signal lines as described under "Lightning Protection" on page 6-3

- Maximum evenly distributed weight that can be supported by Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R — 22.7 kg (50 lb).

# Appendix A. United States and Canada Power Plug Types

IBM supplies power cords with attached plugs for the U.S. and Canada. See Figures A-1 through A-3. You must provide the corresponding power outlet receptacles.

Table A-1. Power Plugs Supplied in the U.S. and Canada

| Unit | Plug Type[1] | | | | | |
|------|----|---|---|---|----|-----|
| | 34 | 4 | 7 | 5 | 10 | 37[2] |
| 3299 | | X | | | | X |
| Model 1L and 11L | X | X | X | X | X | X |
| Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R | | X | X | | | X |
| Models 51R, 52R, 53R, 61R, 62R, and 63R | | X | X | | | X |
| Models 81R, 82R, 91R, and 92R | | X | X | | | X |

**Notes:**

[1] See Figures A-2 and A-3.
[2] Hospital grade plug.

Table A-2. Description of Plugs and Receptacles

| | Provided by IBM | | | | Provided by Customer | | | | | |
|------|-----------------|---------|------|---------|-------|------|-------|-------|-----------|------------|
| Plug Type | Plug Types | | | IBM Reference | Service Rating | | | | Inline Connector | Receptacle |
| | Waterproof | Nonlock | Lock | | Volts | Amps | Phase | Wires | | |
| 34 | 3720 U-2 | | | Russell-Stoll | 250 | 15 | 1 | 3 | 3913 U-2 | 3743 U-2 |
| 4 | | 5-15P | | NEMA | 125 | 15 | 1 | 3 | 5-15R | 5-15R |
| 7 | | | L5-15P | NEMA | 125 | 15 | 1 | 3 | L5-15R | L5-15R |
| 5 | | 6-15P | | NEMA | 250 | 15 | 1 | 3 | 6-15R | 6-15R |
| 10 | | | L6-15P | NEMA | 250 | 15 | 1 | 3 | L6-15R | L6-15R |
| 37[1] | | 5-15P | | NEMA | 125 | 15 | 1 | 3 | 5-15R | 5-15R |

**Note:**

[1] Hospital grade plug.

Waterproof Plugs and Receptacles

| 15 Amperes | | |
|---|---|---|
| | Receptacle | Plug |
| Type | 34 | 34 |
| 250 V |  |  |
| | 3913 U-2/3743 U-2 | 3720 U-2 |

Hospital Grade Plugs and Receptacles

| 15 Amperes | | |
|---|---|---|
| | Receptacle | Plug |
| Type | 37 | 37 |
| 125 V |  |  |
| | 5-15R | 5-15P |

Nonlocking Plugs and Receptacles

| 15 Amperes | | |
|---|---|---|
| | Receptacle | Plug |
| Type | 4 | 4 |
| 125 V |  |  |
| | 5-15R | 5-15P |
| Type | 5 | 5 |
| 250 V |  |  |
| | 6-15R | 6-15P |

Locking Type Plugs and Receptacles

| 15 Amperes | | |
|---|---|---|
| | Receptacle | Plug |
| Type | 7 | 7 |
| 125 V |  |  |
| | L5-15R | L5-15P |
| Type | 10 | 10 |
| 250 V |  |  |
| | L6-15R | L6-15P |

Figure   A-1. NEMA Configurations

# Appendix B. World Trade Power Plug Types

For a World Trade country, IBM supplies the power cord with the attached plug that corresponds to the power outlet receptacle that is most used in that country. Figure B-1 on page B-3 shows each type of power plug available in World Trade countries. Table B-1 lists the power plug types that are attached to devices provided for each country. The numeric designations in the table refer to the illustration in Figure B-1.

Because different plugs are used in different countries, it is difficult to cover all plug installations in one procedure. However, you must do the following:

1. Make sure that the shield of the power cord always has a good electrical connection to the grounding terminal in the plug.

2. Make sure that the grounding wire and/or the drain (shield) wire cannot touch the other (electrically energized) wires.

3. Make sure that the grounding wire (green—green/yellow) is properly attached to the grounding terminal in the plug.

Table B-1. Power Plug Usage Chart

| Country | Voltage Range | | Country | Voltage Range | |
|---|---|---|---|---|---|
| | 125 V | 250 V | | 125 V | 250 V |
| Afghanistan | | 18 | Ireland | | 23 |
| Algeria | | 18 | Israel | | 32 |
| Antigua | | 23 | Italy | | 25 |
| Argentina | | 2 | Jamaica | 4 | 5 |
| Australia | | 6 | Japan | 4, 20 | 5 |
| Austria | | 18 | Malaysia | | 23 |
| Bahamas | 4 | | Mexico | 4 | 10 |
| Bangladesh | | 22 | Nepal | | 5 |
| Barbados | 4 | | Netherlands | | 18 |
| Belgium | | 18 | Netherlands | 4 | 5 |
| Bermuda | 4 | | Antilles | | |
| Bolivia | 4 | | New Zealand | | 6 |
| Brazil | 4 | 2 | Nicaragua | 4 | 5 |
| Brunei | | 23 | Norway | | 18 |
| Bulgaria | | 18 | Panama | 4 | 5 |
| Burma | | 22 | Paraguay | | 2 |
| Cayman Island | 4 | | Peru | | 5 |
| (BWI) | | | Philippines | 4 | 5 |
| Chile | | 25 | Poland | 18 | |
| Colombia | 4 | 2 | Portugal | | 18 |
| Costa Rica | 4 | 5 | Rumania | | 18 |
| Denmark | | 19 | Saudi Arabia | 4 | 23 |
| Dominican Republic | 4 | 5 | Singapore | | 23 |
| Ecuador | 4 | 5 | South Africa | | 22 |
| El Salvador | 4 | 5 | Spain | | 18 |
| Finland | | 18 | Sri Lanka | | 22 |
| France | | 18 | Surinam | | 5 |
| Germany | | 18 | Sweden | | 18 |
| Guatemala | 4 | 5 | Switzerland | | 25 |
| Guyana | 4 | | Taiwan | 4 | 5 |
| Haiti | 4 | 5 | Thailand | | 5 |
| Honduras | 4 | 5 | Trinidad and | 4 | 5 |
| | | | Tobago | | |
| Hong Kong | | 23 | United Kingdom | | 23 |
| Hungary | | 18 | Uruguay | | 2 |
| Iceland | | 18 | Venezuela | 4 | 5 |
| India | | 23 | Western Samoa | | 6 |
| Indonesia | | 18 | Yugoslavia | | 18 |
| Iran | | 18 | | | |

**Notes:**

1. Asian and Latin American countries not listed will receive cords with plug 4 attached.

2. European, Middle East, and African countries not listed will receive cords with plug 18 attached.

| Plug Pin Side View | Plug Pin Side View | Plug Pin Side View |
|---|---|---|
| **2**<br><br>250 V<br>10 A | **10**<br><br>250 V<br>15 A<br>NEMA L6-15P | **23**<br><br>250 V<br>13 A |
| **4**<br><br>125 V<br>15 A<br>NEMA 5-15P | **18**<br><br>250 V<br>16 A | **24**<br><br>250 V<br>10 A |
| **5**<br><br>250 V<br>15 A<br>NEMA 6-15P | **19**<br><br>250 V<br>10 A | **25**<br><br>250 V<br>16 A |
| **6**<br><br>250 V<br>10 A | **20**<br><br>125 V<br>15 A<br>Locking | **32**<br><br>250 V<br>10 A |
| **7**<br><br>125 V<br>15 A<br>Locking<br>NEMA L5-15P | **22**<br><br>250 V<br>16 A | |
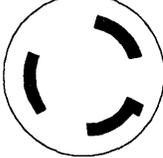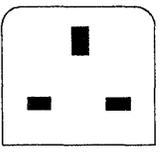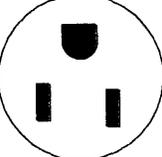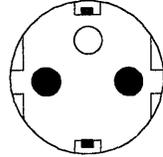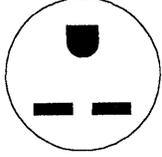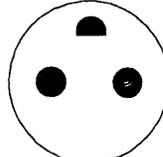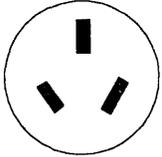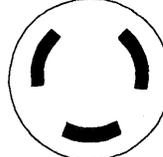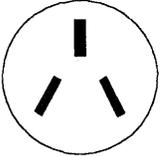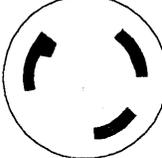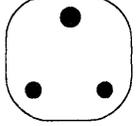
**Note:** All power plugs except 7, 10, and 20 are nonlocking.

Figure   B-1.  Power Plug Diagrams

# Appendix C. Inch-to-Millimeter Conversion Table

The following table gives the millimeter measurement for each inch measurement.

| in. | mm | in. | mm | in. | mm | in. | mm | in. | mm |
|---|---|---|---|---|---|---|---|---|---|
| 1/16 | 1.6 | 22 | 559 | 49 | 1245 | 76 | 1930 | 103 | 2616 |
| 1/8 | 3.2 | 22-1/2 | 572 | 49-1/2 | 1257 | 76-1/2 | 1943 | 103-1/2 | 2629 |
| 3/16 | 4.7 | 23 | 584 | 50 | 1270 | 77 | 1956 | 104 | 2641 |
| 1/4 | 6.4 | 23-1/2 | 597 | 50-1/2 | 1283 | 77-1/2 | 1969 | 104-1/2 | 2654 |
| 5/16 | 7.9 | 24 | 610 | 51 | 1295 | 78 | 1981 | 105 | 2667 |
| 3/8 | 9.5 | 24-1/2 | 622 | 51-1/2 | 1308 | 78-1/2 | 1994 | 105-1/2 | 2679 |
| 7/16 | 11 | 25 | 635 | 52 | 1321 | 79 | 2007 | 106 | 2692 |
| 1/2 | 12.7 | 25-1/2 | 648 | 52-1/2 | 1334 | 79-1/2 | 2019 | 106-1/2 | 2705 |
| 9/16 | 14.3 | 26 | 660 | 53 | 1346 | 80 | 2032 | 107 | 2718 |
| 5/8 | 15.9 | 26-1/2 | 673 | 53-1/2 | 1359 | 80-1/2 | 2045 | 107-1/2 | 2730 |
| 3/4 | 19.1 | 27 | 686 | 54 | 1372 | 81 | 2057 | 108 | 2743 |
| 7/8 | 22.3 | 27-1/2 | 698 | 54-1/2 | 1384 | 81-1/2 | 2070 | 108-1/2 | 2756 |
| 1 | 25.4 | 28 | 711 | 55 | 1397 | 82 | 2083 | 109 | 2768 |
| 1-1/2 | 38.1 | 28-1/2 | 724 | 55-1/2 | 1410 | 82-1/2 | 2096 | 109-1/2 | 2781 |
| 2 | 50.8 | 29 | 737 | 56 | 1423 | 83 | 2108 | 110 | 2794 |
| 2-1/2 | 63.5 | 29-1/2 | 749 | 56-1/2 | 1435 | 83-1/2 | 2121 | 110-1/2 | 2806 |
| 3 | 76.2 | 30 | 762 | 57 | 1448 | 84 | 2134 | 111 | 2819 |
| 3-1/2 | 88.9 | 30-1/2 | 775 | 57-1/2 | 1461 | 84-1/2 | 2146 | 111-1/2 | 2832 |
| 4 | 102 | 31 | 787 | 58 | 1473 | 85 | 2159 | 112 | 2845 |
| 4-1/2 | 114 | 31-1/2 | 801 | 58-1/2 | 1486 | 85-1/2 | 2172 | 112-1/2 | 2857 |
| 5 | 127 | 32 | 813 | 59 | 1499 | 86 | 2184 | 113 | 2870 |
| 5-1/2 | 140 | 32-1/2 | 826 | 59-1/2 | 1511 | 86-1/2 | 2197 | 113-1/2 | 2883 |
| 6 | 152 | 33 | 838 | 60 | 1524 | 87 | 2210 | 114 | 2895 |
| 6-1/2 | 165 | 33-1/2 | 851 | 60-1/2 | 1537 | 87-1/2 | 2223 | 114-1/2 | 2908 |
| 7 | 178 | 34 | 864 | 61 | 1549 | 88 | 2235 | 115 | 2921 |
| 7-1/2 | 191 | 34-1/2 | 876 | 61-1/2 | 1562 | 88-1/2 | 2248 | 115-1/2 | 2933 |
| 8 | 203 | 35 | 889 | 62 | 1575 | 89 | 2261 | 116 | 2946 |
| 8-1/2 | 216 | 35-1/2 | 902 | 62-1/2 | 1588 | 89-1/2 | 2273 | 116-1/2 | 2959 |
| 9 | 229 | 36 | 914 | 63 | 1600 | 90 | 2286 | 117 | 2972 |
| 9-1/2 | 241 | 36-1/2 | 927 | 63-1/2 | 1613 | 90-1/2 | 2299 | 117-1/2 | 2984 |
| 10 | 254 | 37 | 940 | 64 | 1626 | 91 | 2311 | 118 | 2997 |
| 10-1/2 | 267 | 37-1/2 | 953 | 64-1/2 | 1638 | 91-1/2 | 2324 | 118-1/2 | 3010 |
| 11 | 279 | 38 | 965 | 65 | 1651 | 92 | 2337 | 119 | 3022 |
| 11-1/2 | 292 | 38-1/2 | 978 | 65-1/2 | 1664 | 92-1/2 | 2350 | 119-1/2 | 3035 |
| 12 | 305 | 39 | 991 | 66 | 1676 | 93 | 2362 | 120 | 3048 |
| 12-1/2 | 318 | 39-1/2 | 1003 | 66-1/2 | 1689 | 93-1/2 | 2375 | 120-1/2 | 3060 |
| 13 | 330 | 40 | 1016 | 67 | 1702 | 94 | 2388 | 121 | 3073 |
| 13-1/2 | 343 | 40-1/2 | 1029 | 67-1/2 | 1715 | 94-1/2 | 2400 | 121-1/2 | 3086 |
| 14 | 356 | 41 | 1041 | 68 | 1727 | 95 | 2413 | 122 | 3099 |
| 14-1/2 | 368 | 41-1/2 | 1054 | 68-1/2 | 1740 | 95-1/2 | 2426 | 122-1/2 | 3111 |
| 15 | 381 | 42 | 1067 | 69 | 1753 | 96 | 2438 | 123 | 3124 |
| 15-1/2 | 394 | 42-1/2 | 1080 | 69-1/2 | 1765 | 96-1/2 | 2451 | 123-1/2 | 3137 |
| 16 | 406 | 43 | 1092 | 70 | 1778 | 97 | 2464 | 124 | 3149 |
| 16-1/2 | 419 | 43-1/2 | 1105 | 70-1/2 | 1791 | 97-1/2 | 2477 | 124-1/2 | 3162 |
| 17 | 432 | 44 | 1118 | 71 | 1803 | 98 | 2489 | 125 | 3175 |
| 17-1/2 | 445 | 44-1/2 | 1130 | 71-1/2 | 1816 | 98-1/2 | 2502 | 125-1/2 | 3187 |
| 18 | 457 | 45 | 1143 | 72 | 1828 | 99 | 2515 | 126 | 3200 |
| 18-1/2 | 470 | 45-1/2 | 1156 | 72-1/2 | 1841 | 99-1/2 | 2527 | 126-1/2 | 3213 |
| 19 | 483 | 46 | 1168 | 73 | 1854 | 100 | 2540 | 127 | 3226 |
| 19-1/2 | 495 | 46-1/2 | 1181 | 73-1/2 | 1867 | 100-1/2 | 2553 | 127-1/2 | 3238 |
| 20 | 508 | 47 | 1194 | 74 | 1880 | 101 | 2565 | 128 | 3251 |
| 20-1/2 | 521 | 47-1/2 | 1207 | 74-1/2 | 1892 | 101-1/2 | 2578 | 128-1/2 | 3264 |
| 21 | 533 | 48 | 1219 | 75 | 1905 | 102 | 2591 | 129 | 3276 |
| 21-1/2 | 546 | 48-1/2 | 1232 | 75-1/2 | 1918 | 102-1/2 | 2604 | 129-1/2 | 3289 |

# Appendix D.  Voltage Limitations

The following table lists the voltage limitations for each region and frequency.

|  | Voltage | | |
|---|---|---|---|
|  | **Nom** | **Min** | **Max** |
| **Americas/Far East (50 Hz)** | 100 | 90 | 110 |
|  | 110 | 96.5 | 119 |
|  | 200 | 180 | 220 |
|  | 220 | 193 | 238 |
|  | 230 | 202 | 249 |
|  | 240 | 210 | 259 |
|  | 380 | 333 | 410 |
|  | 400 | 350 | 432 |
|  | 415 | 363 | 448 |
| **Americas/Far East (60 Hz)** | 100 | 90 | 110 |
|  | 110 | 96.5 | 119 |
|  | 120 | 104 | 127 |
|  | 127 | 111 | 137 |
|  | 200 | 180 | 220 |
|  | 208 | 180 | 220 |
|  | 220 | 193 | 238 |
|  | 240 | 208 | 254 |
|  | 380 | 333 | 410 |
| **Europe/Middle East/Africa (50 Hz)** | 110 | 96.5 | 119 |
|  | 220 | 193 | 238 |
|  | 240 | 210 | 259 |
|  | 380 | 333 | 410 |
|  | 415 | 363 | 448 |
| **United States and Canada (60 Hz)** | 120 | 104 | 127 |
|  | 208 | 180 | 220 |
|  | 240 | 208 | 254 |

# Appendix E. Acoustical Data

The following table lists the noise-emission values for the 3174 and the 3299 Terminal Multiplexer.

| Table | E-1. Declaration of IBM Product Noise-Emission Values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Machine** | | | | **LWAd** | | **LpAm** | | **<LpAm>** | | | |
| **Type** | **Description** | **Model** | **Frequency (Hz)** | **Operating (bels)** | **Idling (bels)** | **Operating (dB)** | **Idling (dB)** | **Operating (dB)** | **Idling (dB)** | **I** | **T** |
| 3174 | Establishment Controller | 1L,1R 2R,3R, 11L,11R, 12R,13R | 50/60 | 6.5 | NA | NA | NA | 46.0 | NA | No | Yes |
| 3174 | Establishment Controller | 51R,52R, 53R,61R, 62R,63R | 50/60 | 5.4 | NA | NA | NA | 36.0 | NA | No | No |
| 3174 | Establishment Controller | 81R,82R, 91R,92R, | 50/60 | 5.3 | | | | 37.0 | | No | No |
| 3299 | Terminal Multiplexer | All | 50/60 | No detectable acoustical noise | | | | | | | |
| **Legend:** | | | | | | | | | | | |
| LWAd | The declared sound power emission level for a production series of machines. | | | | | | | | | | |
| LpAm | The mean value of the sound pressure emission levels at the operator position (if any) for a production series of machines. | | | | | | | | | | |
| <LpAm> | The mean value of the space averaged sound pressure emission levels at the 1-meter positions for a productive series of machines. | | | | | | | | | | |
| I | Impulsive Noise. Entry is either Yes or No. | | | | | | | | | | |
| T | Prominent Discrete Tones. Entry is either Yes or No. | | | | | | | | | | |
| NA | Not applicable (that is, no operator position). | | | | | | | | | | |

**Note:** All measurements are made in accordance with International Standards Organization (ISO) Draft International Standard (DIS) 7779 and reported in conformance with ISO DIS 757414.

# Appendix F. Products That Support Direct Attachment of the 3174

The remotely-attached models of the 3174 can communicate with IBM hosts without modems or other DCE. You can attach the 3174 to the host through the controller's EIA 232D (CCITT V.24/V.28), X.21 (CCITT V.11), or CCITT V.35 interface, using the appropriate cables.

Products that support direct attachment of the 3174 are listed in Table F-1 on page F-2. Only the interface features needed by the direct-connection products are listed. They may have prerequisites. Consult your IBM sales representative for information on those products.

The maximum cable length allowed between the 3174 interface and the host product interface is 122 m (400 ft) unless the host product imposes a shorter limit. The physical planning manuals for those products provide cabling data and other information necessary for direct-connection attachment.

The physical planning manuals for different products listed below:

| Product | Manual |
|---------|--------|
| 3725/3726 | *IBM System/360 System/370: 4300 Processors I/O Equipment Installation Manual — Physical Planning* |
| 3710 | *IBM 3710 Network Controller Planning* |
| 43xx | *IBM 4300 Processors Installation Manual — Physical Planning* |
| 91xx | *IBM 9100 Information System Site Planning Guide* |
| 91xx | *IBM 9100 Information System Communications, Loop, and Display/Printer Attachment Description.* |

| IBM Unit Attach | Speed (Kbps) | Host Feature Number | BSC | SDLC | Model (Interface) |
|---|---|---|---|---|---|
| 3720/3721 | 2.4, 4.8, or 9.6 | 4911 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 19.2 | 4911 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 2.4, 4.8, or 9.6 | 4931 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| | 19.2, 38.4, or 56 | 4931 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| | 2.4, 4.8, 9.6 | 4941 | | X | 2R, 12R (X.21) |
| | 2.4, 4.8, 9.6, 19.2, 38.4, or 56 | 4942 | | X | 2R, 12R (X.21) |
| 3725/3726 | 2.4, 4.8, or 9.6 | 4911 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 19.2 | 4911 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 2.4, 4.8, or 9.6 | 4931 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| | 19.2 or 56 | 4931 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| | 2.4, 4.8, or 9.6 | 4941 | | X | 2R, 12R, 52R, 62R, 82R, 92R (V.11) |
| | 2.4, 4.8, 9.6, 19.2, 56 | 4942 | | X | 2R, 12R, 52R, 62R, 82R, 92R (V.11) |
| 3710 | 2.4, 3.6, 4.8, 7.2, 9.6, 14.4, 19.2 | 7001 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 2.4, 3.6, 4.8, 7.2, 9.6, 14.4, 19.2, 48, 56, 64 | 7005 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| 3710 | 48, 56, 64 | 7005 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| 4361 | 2.4 | 4801 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 4.8 | 4801 | X | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| 9101/ 9130/ 9140 Models A and B | 2.4 | 3701 (FAC 15) | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| Models A and B | 4.8, 9.6 | 3701 (FAC 16) | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| 9101/ 9130/ 9140 Models A and B | 2.4 | 1550 (FAC 24) | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| Models A and B | 4.8, 9.6 | 1550 (FAC 25) | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| Models A and B | 56 | 1550 (FAC 26) | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |

Table   F-1 (Page 1 of 2). Products That Support Direct-Connection Attachment of the 3174

| IBM Unit Attach | Speed (Kbps) | Host Feature Number | BSC | SDLC | Model (Interface) |
|---|---|---|---|---|---|
| 9140 Model C | 4.8 | 1621 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 56 | 1614 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |
| 9150 | 4.8, 9.6 | 1733 or 1734 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.24) |
| | 56 | 1742 or 1745 | | X | 1R, 11R, 51R, 61R, 81R, 91R (V.35) |

Table F-1 (Page 2 of 2). Products That Support Direct-Connection Attachment of the 3174

# Appendix G. 3174 Cabling Worksheets

This appendix contains instructions for use and completion of individual worksheets.

> **Permission to Copy**
>
> You are authorized to copy the worksheets in Appendix G for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.

# Hardware Cabling for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

- Determine the components that you will use and draw in the connecting cables as indicated by the dotted lines.

- Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheets show all cables to be installed in **BOLD BLACK**. TMA-to-TA cabling is installed at the time of manufacture and is shown but not highlighted.

- Use the cabling worksheets for cable installation. **You are authorized to copy the worksheets in Appendix G for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store these worksheets with the 3174 documentation for future reference. The worksheets are necessary to perform terminal-connection problem determination. When cabling changes are made, correct these worksheets to reflect such changes.
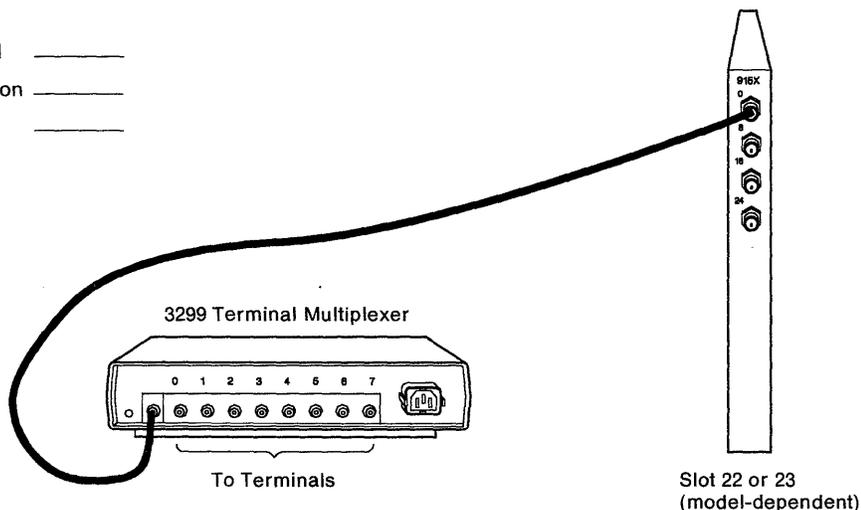
## Terminal Multiplexer Adapter Worksheets

The following sections provide the worksheets for the TMA on Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R.

### Port Range 00 – 07 (TMA 1 — Worksheet 1A)

This worksheet identifies the cabling from the Terminal Adapter (TA) connector 0 to the first TMA (TMA 1). Terminals connected to TA connector 0 have port addresses between 26 – 00 and 26 – 07.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

TMA Location __15__

| TA Card Type | Location |
|---|---|
| 9150 | 22 or 23 |
| 9154 | 21 |
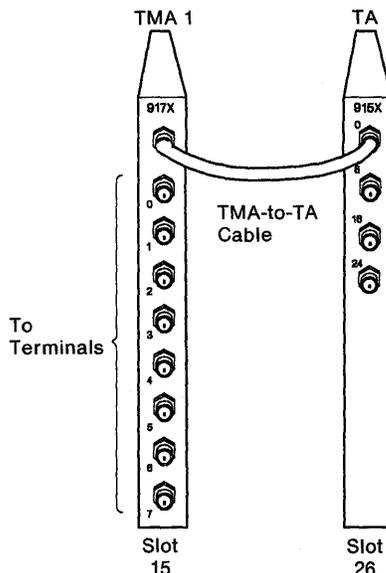


From TMA 1 to the Terminals — Port Range 00-07

| TMA 1 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |
| 4 | _____ | _____ | _____ | 26-04 |
| 5 | _____ | _____ | _____ | 26-05 |
| 6 | _____ | _____ | _____ | 26-06 |
| 7 | _____ | _____ | _____ | 26-07 |

## Port Range 08 – 15 (TMA 2 — Worksheet 1B)

This worksheet identifies the cabling from the TA connector 8 to the second TMA (TMA 2). Terminals connected to TA connector 8 have port addresses between 26 – 08 and 26 – 15.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model    ———

3174 Location ———

3174 ID    ———

TMA Location ——16*——

| TA Card Type | Location |
|---|---|
| 9150 | 22 or 23 |
| 9154 | 21 |
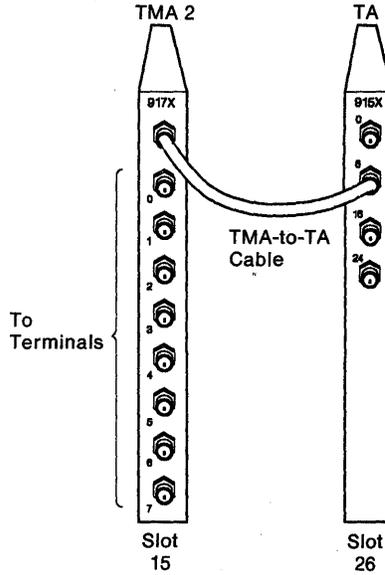
*Depends on installed features



From TMA 2 to the Terminals — Port Range 08-15

| TMA 2 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ——— | ——— | ——————— | 26-08 |
| 1 | ——— | ——— | ——————— | 26-09 |
| 2 | ——— | ——— | ——————— | 26-10 |
| 3 | ——— | ——— | ——————— | 26-11 |
| 4 | ——— | ——— | ——————— | 26-12 |
| 5 | ——— | ——— | ——————— | 26-13 |
| 6 | ——— | ——— | ——————— | 26-14 |
| 7 | ——— | ——— | ——————— | 26-15 |

## Port Range 16 – 23 (TMA 3 — Worksheet 1C)

This worksheet identifies the cabling from the TA connector 16 to the third (TMA 3). Terminals connected to TA connector 16 have port addresses between 26 – 16 and 26 – 23.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model ———

3174 Location ———

3174 ID ———

TMA Location 11 or 23*

| TA Card Type | Location |
|---|---|
| 9150 | 22 or 23 |
| 9154 | 21 |
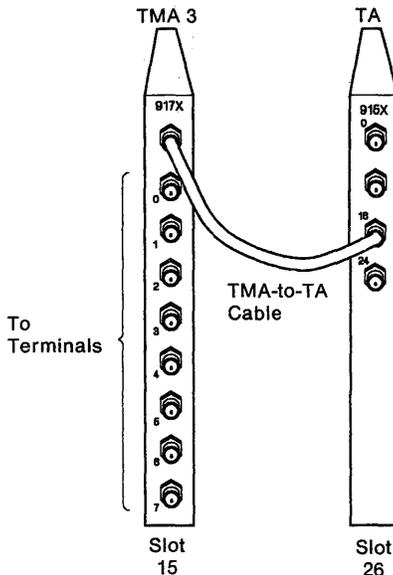
*Depends on installed features



From TMA 3 to the Terminals — Port Range 16 – 23

| TMA 3 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ———— | ———— | ———————— | 26-16 |
| 1 | ———— | ———— | ———————— | 26-17 |
| 2 | ———— | ———— | ———————— | 26-18 |
| 3 | ———— | ———— | ———————— | 26-19 |
| 4 | ———— | ———— | ———————— | 26-20 |
| 5 | ———— | ———— | ———————— | 26-21 |
| 6 | ———— | ———— | ———————— | 26-22 |
| 7 | ———— | ———— | ———————— | 26-23 |

## Port Range 24 – 31 (TMA 4 — Worksheet 1D)

This worksheet identifies the cabling from the TA connector 24 to the fourth (TMA 4). Terminals connected to TA connector 16 have port addresses between 26 – 24 and 26 – 31.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model ————

3174 Location ————

3174 ID ————

TMA Location 23, 22, 12, 17, 24, 13*

| TA Card Type | Location |
|---|---|
| 9150 | 22 or 23 |
| 9154 | 21 |

*Depends on installed features

TMA 4

TA

917X

915X

To Terminals

TMA-to-TA Cable

Slot 15

Slot 26
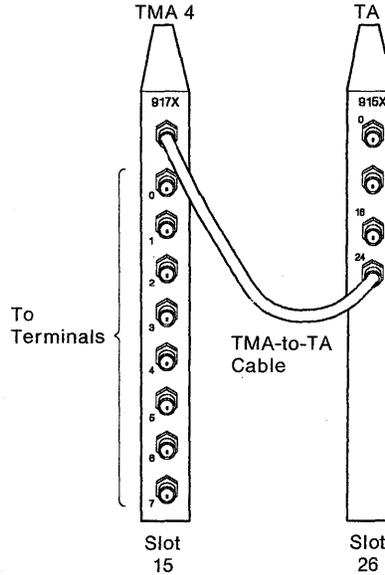
From TMA 4 to the Terminals — Port Range 24-31

| TMA 4 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ———— | ———— | ———————— | 26-24 |
| 1 | ———— | ———— | ———————— | 26-25 |
| 2 | ———— | ———— | ———————— | 26-26 |
| 3 | ———— | ———— | ———————— | 26-27 |
| 4 | ———— | ———— | ———————— | 26-28 |
| 5 | ———— | ———— | ———————— | 26-29 |
| 6 | ———— | ———— | ———————— | 26-30 |
| 7 | ———— | ———— | ———————— | 26-31 |

## 3299 Terminal Multiplexer Adapter Worksheets

The following sections provide the worksheets for the 3299 Terminal Multiplexer Adapter (TMA) on Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R.

### Port Range 00 − 07 (Worksheet 2A)

This worksheet identifies the cabling from the 3174 TA connector 0 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 0 have port addresses between 26 − 00 and 26 − 07.

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.



3174 Model  _____
3174 Location _____
3174 ID  _____

3299 Terminal Multiplexer

To Terminals

Slot 22 or 23
(model-dependent)

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | _____ |

From the 3299 to the Terminals — Port Range 00-07

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |
| 4 | _____ | _____ | _____ | 26-04 |
| 5 | _____ | _____ | _____ | 26-05 |
| 6 | _____ | _____ | _____ | 26-06 |
| 7 | _____ | _____ | _____ | 26-07 |

## Port Range 08 – 15 (Worksheet 2B)

This worksheet identifies the cabling from the 3174 TA connector 8 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 8 have port addresses between 26 – 08 and 26 – 15.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

3299 Terminal Multiplexer

0 1 2 3 4 5 6 7

To Terminals

Slot 22 or 23
(model-dependent)

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 8 | _____ | _____ | _____ | _____ |

From the 3299 to the Terminals — Port Range 08-15

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-08 |
| 1 | _____ | _____ | _____ | 26-09 |
| 2 | _____ | _____ | _____ | 26-10 |
| 3 | _____ | _____ | _____ | 26-11 |
| 4 | _____ | _____ | _____ | 26-12 |
| 5 | _____ | _____ | _____ | 26-13 |
| 6 | _____ | _____ | _____ | 26-14 |
| 7 | _____ | _____ | _____ | 26-15 |

## Port Range 16 – 23 (Worksheet 2C)

This worksheet identifies the cabling from the 3174 TA connector 16 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 16 have port addresses between 26 – 16 and 26 – 23.
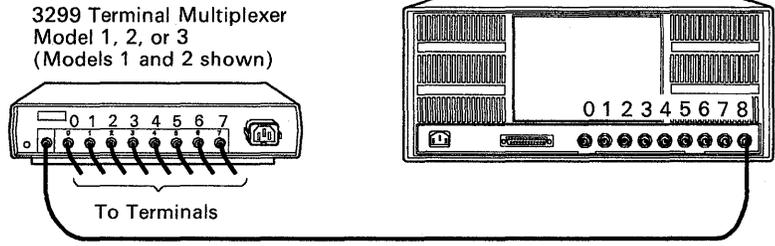
Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model  ———

3174 Location ———

3174 ID  ———



3299 Terminal Multiplexer

To Terminals

Slot 22 or 23
(model-dependent)

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 16 | ——— | ——— | ——— | ——— |

From the 3299 to the Terminals — Port Range 16-23

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ——— | ——— | ——— | 26-16 |
| 1 | ——— | ——— | ——— | 26-17 |
| 2 | ——— | ——— | ——— | 26-18 |
| 3 | ——— | ——— | ——— | 26-19 |
| 4 | ——— | ——— | ——— | 26-20 |
| 5 | ——— | ——— | ——— | 26-21 |
| 6 | ——— | ——— | ——— | 26-22 |
| 7 | ——— | ——— | ——— | 26-23 |

## Port Range 24 – 31 (Worksheet 2D)

This worksheet identifies the cabling from the 3174 TA connector 24 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 24 have port addresses between 26 – 24 and 26 – 31.

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.
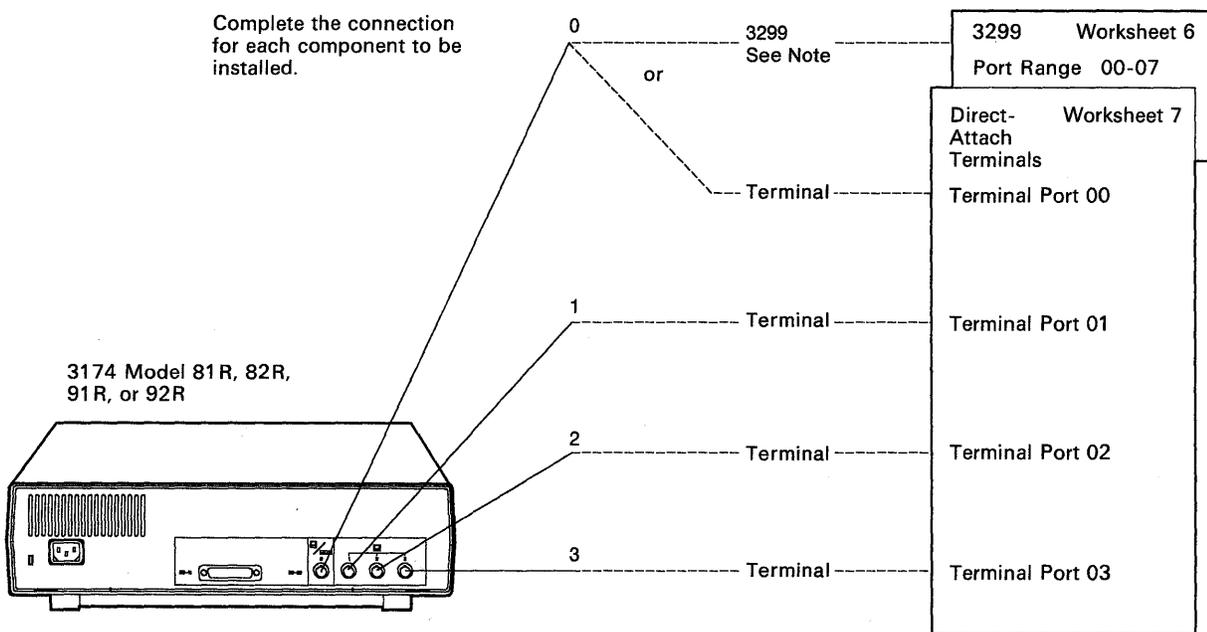
3174 Model   ————

3174 Location ————

3174 ID   ————

3299 Terminal Multiplexer

0 1 2 3 4 5 6 7

To Terminals

Slot 22 or 23
(model-dependent)
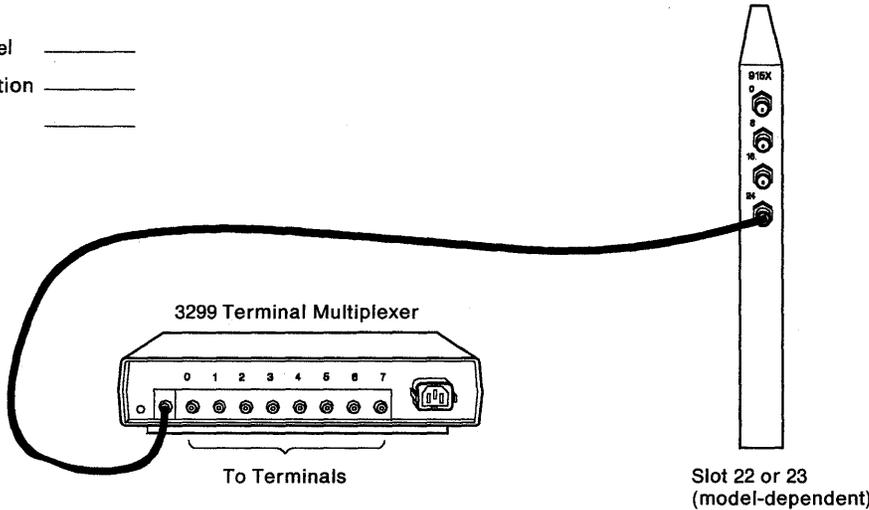
From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 24 | ———— | ———— | ———————— | ———— |

From the 3299 to the Terminals — Port Range 24-31

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ———— | ———— | ———————— | 26-24 |
| 1 | ———— | ———— | ———————— | 26-25 |
| 2 | ———— | ———— | ———————— | 26-26 |
| 3 | ———— | ———— | ———————— | 26-27 |
| 4 | ———— | ———— | ———————— | 26-28 |
| 5 | ———— | ———— | ———————— | 26-29 |
| 6 | ———— | ———— | ———————— | 26-30 |
| 7 | ———— | ———— | ———————— | 26-31 |

## 3174 to Terminal — Direct Connection (Worksheet 3)

This worksheet identifies the cabling from the 3174 TA connectors 0, 8, 16, and 24 directly to the terminals.

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____
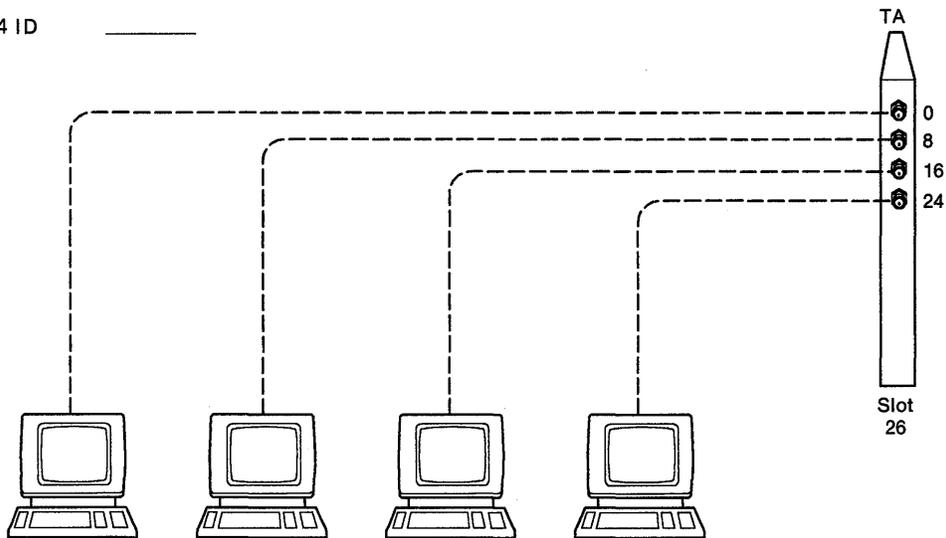
From the TA to the Terminals

| TA Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 8 | _____ | _____ | _____ | 26-08 |
| 16 | _____ | _____ | _____ | 26-16 |
| 24 | _____ | _____ | _____ | 26-24 |

# Hardware Cabling for Models 51R, 52R, 53R, 61R, 62R, and 63R

- Determine the components that you will use and draw in the connecting cables as indicated by the dotted lines.

- Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheets show all cabling to be installed in **BOLD BLACK**.

- Use the cabling worksheets for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store these worksheets with the 3174 documentation for future reference. The worksheets are necessary to perform terminal-connection problem determination. When cabling changes are made, correct these worksheets to reflect such changes.



**Note:** If a 3299 Terminal Multiplexer is attached to connector 0, then no terminals can be directly attached to connectors 1 through 7.

## 3299 Terminal Multiplexer Adapter Worksheets

The following sections provide the worksheets for the 3299 on Models 51R, 52R, 53R, 61R, 62R, and 63R.

### Port Range 00 – 07 (Worksheet 4A)

This worksheet identifies the cabling from the 3174 TA connector 0 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 0 have port addresses between 26-00 and 26-07.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this worksheet to reflect such changes.

3174 Model _____
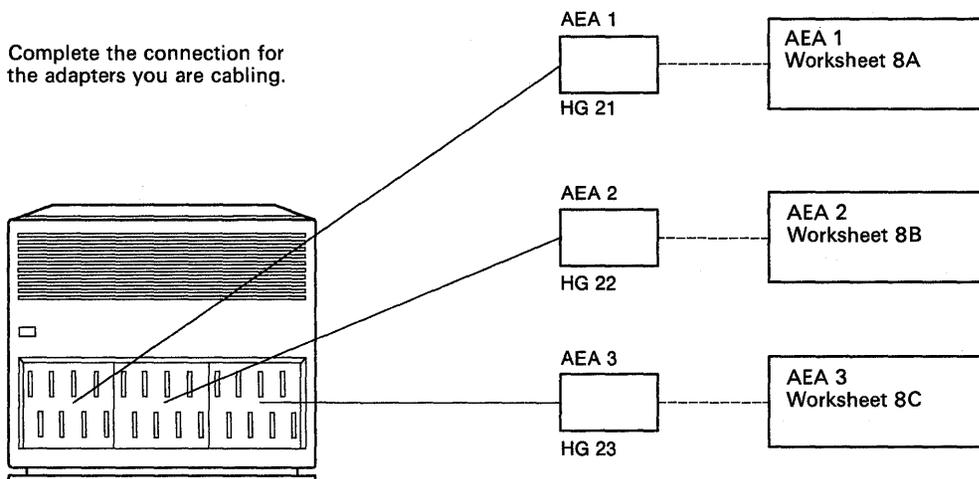
3174 Location _____

3174 ID _____

**Note:** If a 3299 Terminal Multiplexer is attached to connector 0, then no terminals can be attached to connectors 1 through 7.

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | _____ |

From the 3299 to the Terminals — Port Range 00-07

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |
| 4 | _____ | _____ | _____ | 26-04 |
| 5 | _____ | _____ | _____ | 26-05 |
| 6 | _____ | _____ | _____ | 26-06 |
| 7 | _____ | _____ | _____ | 26-07 |

## Port Range 08 − 15 (Worksheet 4B)

This worksheet identifies the cabling from the 3174 TA connector 8 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 0 have port addresses between 26-08 and 26-15.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this worksheet to reflect such changes.

3174 Model ⎯⎯⎯⎯

3174 Location ⎯⎯⎯⎯

3174 ID ⎯⎯⎯⎯

3299 Terminal Multiplexer
Model 1, 2, or 3
(Models 1 and 2 shown)

3174 Model 51R, 52R, 53R,
61R, 62R, or 63R

To Terminals

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 8 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯⎯ | ⎯⎯⎯ |

From the 3299 to the Terminals — Port Range 08-15

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-08 |
| 1 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-09 |
| 2 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-10 |
| 3 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-11 |
| 4 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-12 |
| 5 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-13 |
| 6 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-14 |
| 7 | ⎯⎯⎯ | ⎯⎯⎯ | ⎯⎯⎯⎯⎯ | 26-15 |

## 3174 to Terminal — Direct Connection (Worksheet 5)

This worksheet identifies the cabling from the 3174 TA connectors 0 through 8 directly to terminals.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this worksheet to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

3174 Model 51R, 52R, 53R,
61R, 62R, or 63R

0 1 2 3 4 5 6 7 8

To Terminals {

Complete the connection
for each DIRECT-ATTACHED
terminal to be installed.

**Note:** If a 3299 is attached to connector 0, then no terminals can be attached to connectors 1 through 7.

From the 3174 to the Terminals — Direct Connection

| TA Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |
| 4 | _____ | _____ | _____ | 26-04 |
| 5 | _____ | _____ | _____ | 26-05 |
| 6 | _____ | _____ | _____ | 26-06 |
| 7 | _____ | _____ | _____ | 26-07 |
| 8 | _____ | _____ | _____ | 26-08 |

# Hardware Cabling for Models 81R, 82R, 91R, and 92R

- Determine the components that you will use and draw in the connecting cables as indicated by the dotted lines.

- Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheets show all cabling to be installed in **BOLD BLACK**.

- Use the cabling worksheets for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store these worksheets with the 3174 documentation for future reference. The worksheets are necessary to perform terminal-connection problem determination. When cabling changes are made, correct these worksheets to reflect such changes.



**Note:** If a 3299 Terminal Multiplexer is attached to connector 0, then no terminals can be directly attached to connector 1, 2, or 3.

## 3299 Terminal Multiplexer Port Range 00 – 07 (Worksheet 6)

This worksheet identifies the cabling from the 3174 TA connector 0 to the 3299 and from the 3299 to the terminals. Terminals connected to TA connector 0 have port addresses between 26-00 and 26-07.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this worksheet to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

3174 Model 81R, 82R, 91R, or 92R

0 1 2 3

3299 Terminal Multiplexer Model 1, 2, or 3 (Models 1 and 2 shown)

0 1 2 3 4 5 6 7
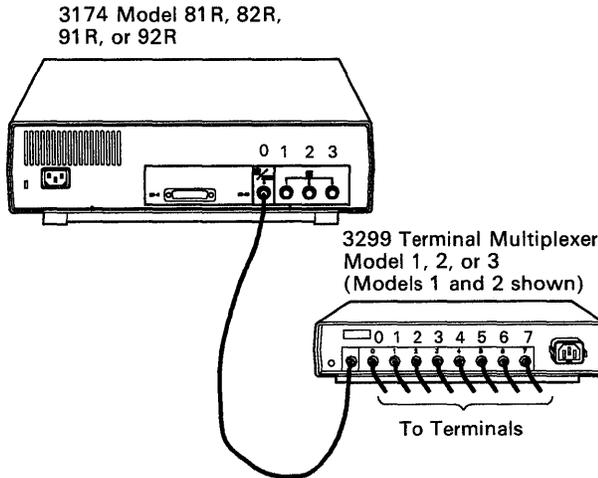
To Terminals

**Note:** If a 3299 is attached to connector 0, then no terminals can be attached to connectors 1, 2, or 3.

From the 3174 to the 3299

| 3174 TA Connector | 3299 Cable ID | 3299 Model | 3299 Location | 3299 ID or Number |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | _____ |

From the 3299 to the Terminals — Port Range 00-07

| 3299 Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |
| 4 | _____ | _____ | _____ | 26-04 |
| 5 | _____ | _____ | _____ | 26-05 |
| 6 | _____ | _____ | _____ | 26-06 |
| 7 | _____ | _____ | _____ | 26-07 |

# 3174 to Terminal — Direct Connection (Worksheet 7)

This worksheet identifies the cabling from the 3174 TA connectors 0, 1, 2, and 3 directly to the terminals.

Complete this worksheet during site planning and use it during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this worksheet to reflect such changes.
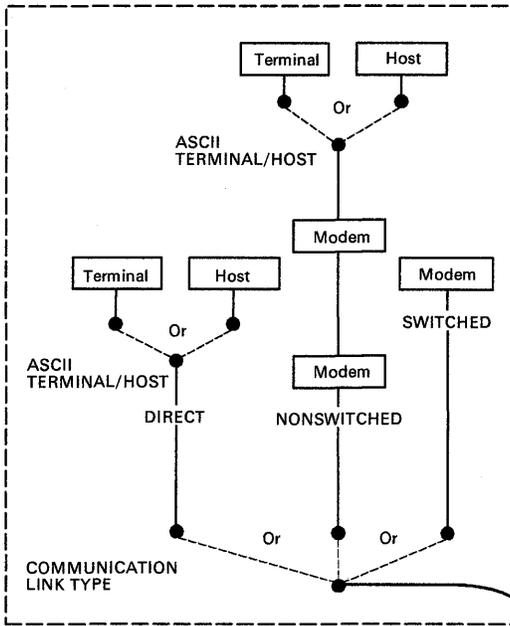
3174 Model _____

3174 Location _____

3174 ID _____

3174 Model 81R, 82R, 91R, or 92R

0 1 2 3

Complete the connection for each DIRECT-ATTACHED terminal to be installed.

**Note:** If a 3299 is attached to connector 0, then no terminals can be directly attached to connectors 1 through 7.

From the 3174 to the Terminals — Direct Connection

| TA Connector | Terminal Cable ID | Terminal Type | Terminal Location | Terminal Port Address |
|---|---|---|---|---|
| 0 | _____ | _____ | _____ | 26-00 |
| 1 | _____ | _____ | _____ | 26-01 |
| 2 | _____ | _____ | _____ | 26-02 |
| 3 | _____ | _____ | _____ | 26-03 |

# AEA Cabling for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

- Determine the Asynchronous Emulation Adapters that you will use and draw in the connecting cables as indicated by the dotted lines.

- Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheets show all cables to be installed in **BOLD BLACK**.

- Use the cabling worksheets for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store these worksheets with the 3174 documentation for future reference. The worksheets are necessary to perform terminal-connection problem determination. When cabling changes are made, correct these worksheets to reflect such changes.

Complete the connection for
the adapters you are cabling.

| AEA 1 | | AEA 1 Worksheet 8A |
| --- | --- | --- |
| HG 21 | | |

| AEA 2 | | AEA 2 Worksheet 8B |
| --- | --- | --- |
| HG 22 | | |

| AEA 3 | | AEA 3 Worksheet 8C |
| --- | --- | --- |
| HG 23 | | |

# Port Range 21 − 00 to 21 − 07 (AEA 1 — Worksheet 8A)

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____ 3174 Location _____ 3174 ID _____

**AEA Port Range 21-00 to 21-03**

| AEA 1 Connector | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 21-00 | 21-01 | 21-02 | 21-03 |

**AEA Port Range 21-04 to 21-07**

| AEA 1 Connector | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 21-04 | 21-05 | 21-06 | 21-07 |

Complete all dotted line connections to the
communication link type for this installation.

All eight connectors have the same cabling.
Cabling for connector 0 is expanded for clarity.

**Legend:**

D  = Direct - No Modem
N  = Nonswitched
S  = Switched
DM = Dedicated Modem
SM = Switched Modem
A  = Automatic Dial
M  = Manual Dial
T  = ASCII Terminal
H  = ASCII Host

## Port Range 22 – 00 to 22 – 07 (AEA 2 — Worksheet 8B)

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

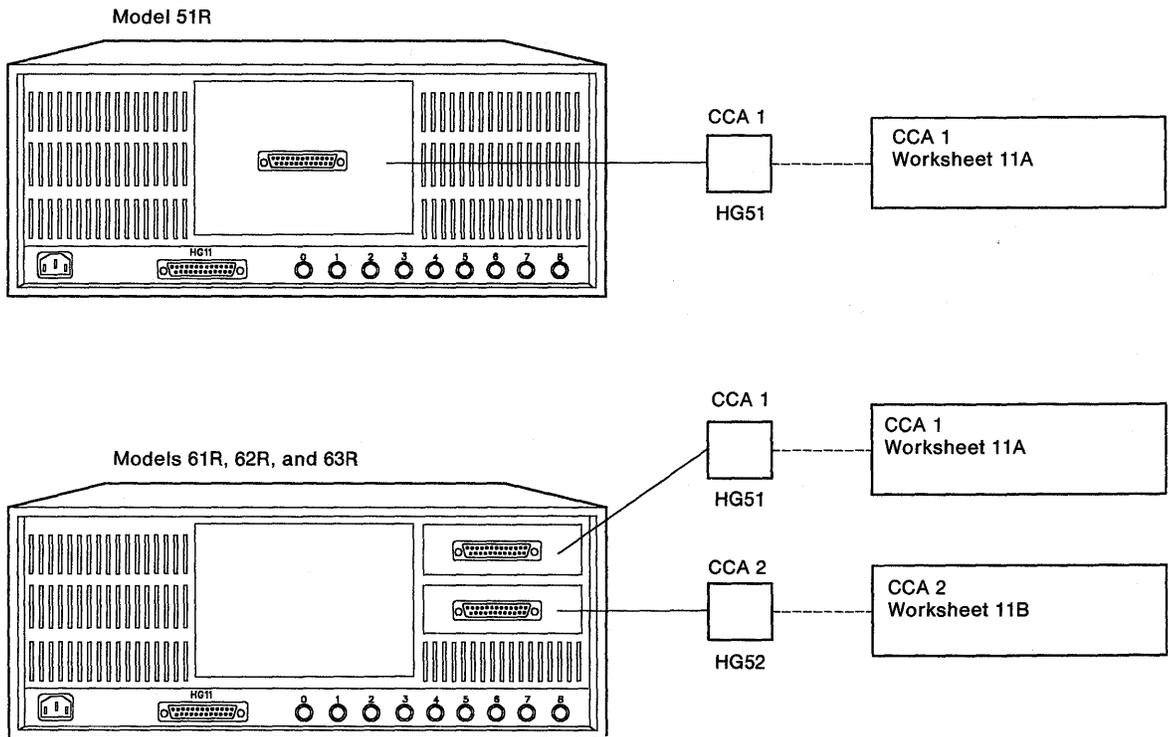3174 Model _____ 3174 Location _____ 3174 ID _____

**AEA Port Range 22-00 to 22-03**

| AEA 2 Connector | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 22-00 | 22-01 | 22-02 | 22-03 |

**AEA Port Range 22-04 to 22-07**

| AEA 2 Connector | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 22-04 | 22-05 | 22-06 | 22-07 |
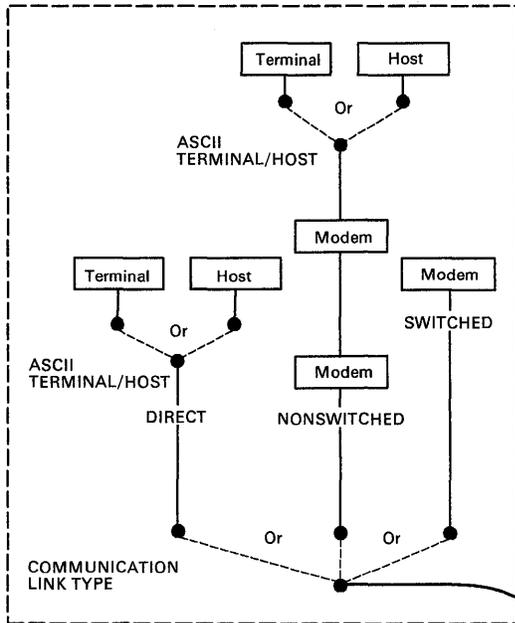
Complete all dotted line connections to the communication link type for this installation.

All eight connectors have the same cabling. Cabling for connector 0 is expanded for clarity.

**Legend:**

D   = Direct - No Modem
N   = Nonswitched
S   = Switched
DM = Dedicated Modem
SM = Switched Modem
A   = Automatic Dial
M   = Manual Dial
T   = ASCII Terminal
H   = ASCII Host
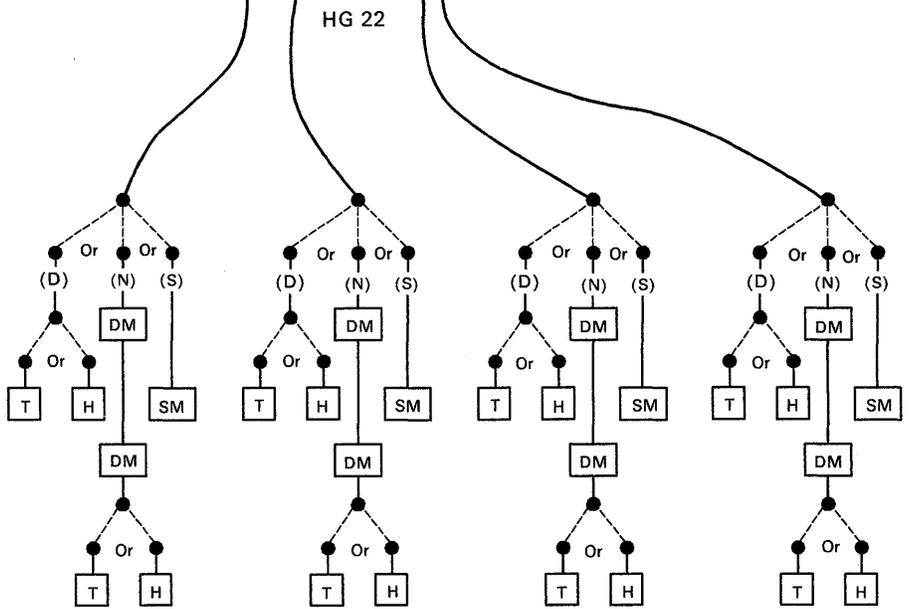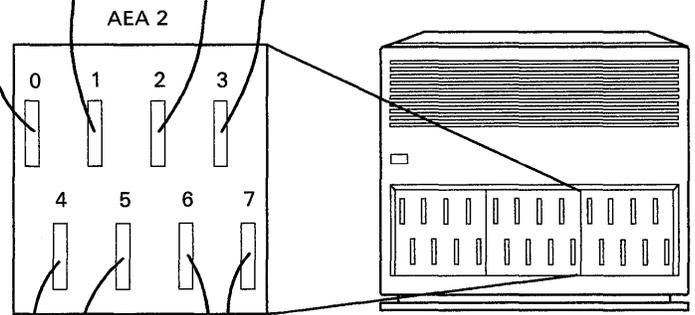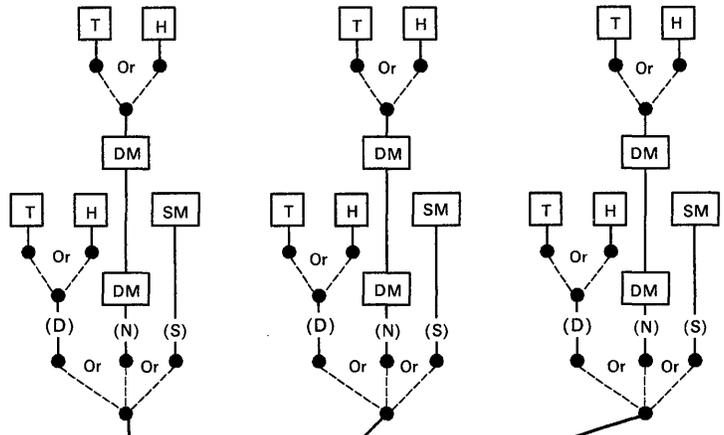
# Port Range 23 – 00 to 23 – 07 (AEA 3 – Worksheet 8C)

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____ 3174 Location _____ 3174 ID _____

### AEA Port Range 23-00 to 23-03

| AEA 3 Connector | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 23-00 | 23-01 | 23-02 | 23-03 |

### AEA Port Range 23-04 to 23-07

| AEA 3 Connector | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 23-04 | 23-05 | 23-06 | 23-07 |
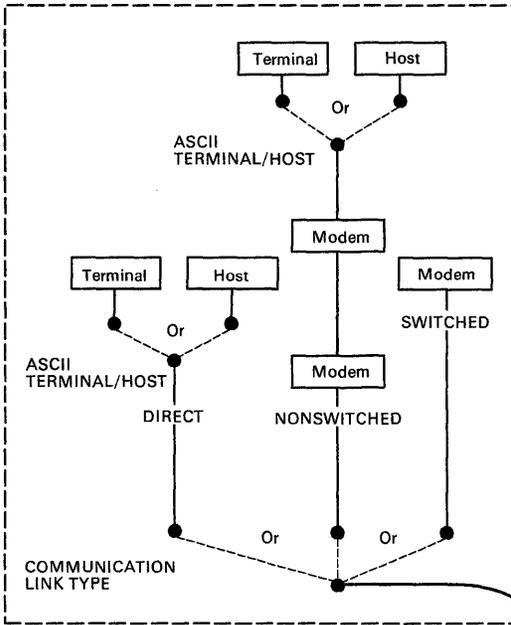
Complete all dotted line connections to the communication link type for this installation.

All eight connectors have the same cabling. Cabling for connector 0 is expanded for clarity.

**Legend:**

| | | |
|---|---|---|
| D | = | Direct - No Modem |
| N | = | Nonswitched |
| S | = | Switched |
| DM | = | Dedicated Modem |
| SM | = | Switched Modem |
| A | = | Automatic Dial |
| M | = | Manual Dial |
| T | = | ASCII Terminal |
| H | = | ASCII Host |
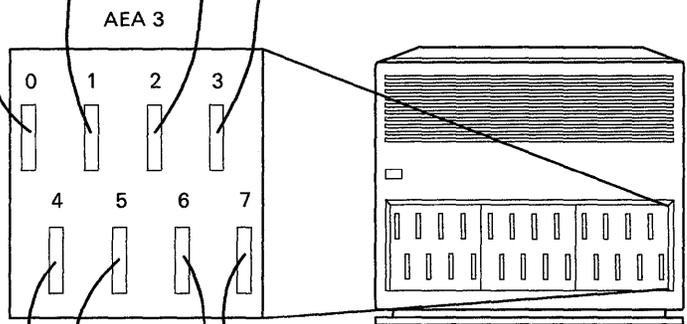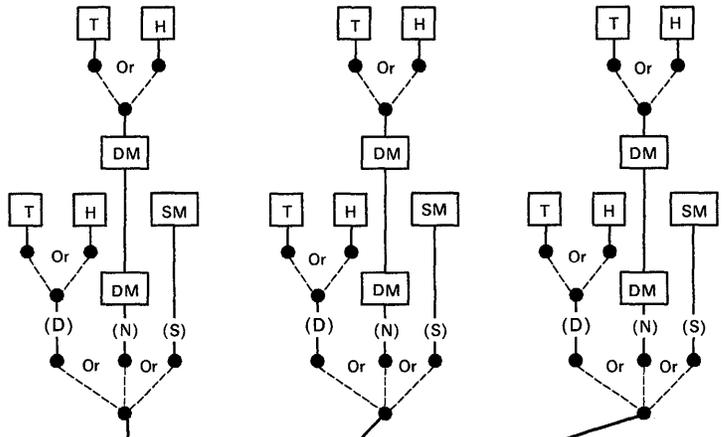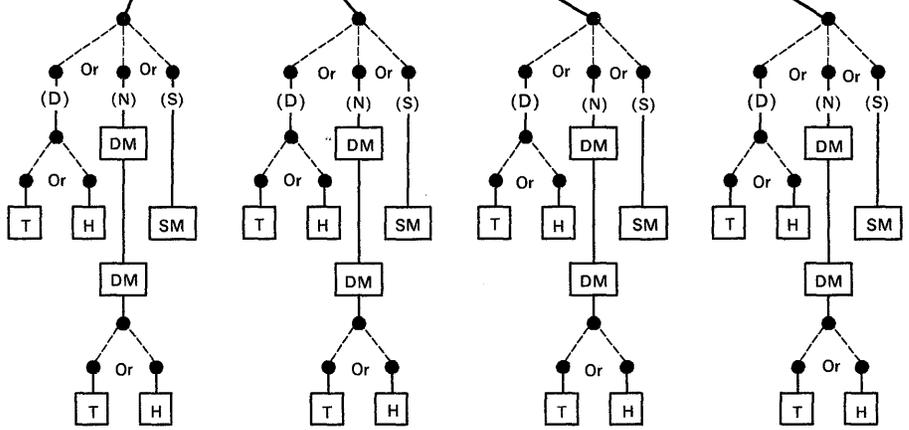
# AEA Cabling for Models 51R, 52R, 61R, 62R, and 63R

- Only one AEA can be used with the 3174 Models 51R, 52R, 61R, 62R, and 63R. If you have an AEA, go to worksheet number 9 and complete that worksheet. The accompanying worksheet shows all cabling to be installed in **BOLD BLACK**.

- Use the cabling worksheet for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store this worksheet with the 3174 documentation for future reference. The worksheet is necessary to perform terminal-connection problem determination. When cabling changes are made, correct the worksheet to reflect those changes.
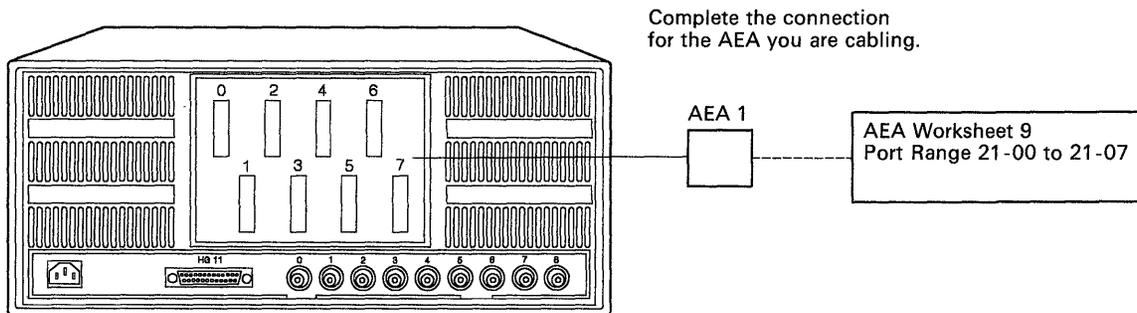
## Port Range 21 – 00 to 21 – 07 (AEA 1 – Worksheet 9)

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____ 3174 Location _____ 3174 ID _____

**AEA Port Range 21-00 to 21-03**

| AEA 1 Connector | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 21-00 | 21-01 | 21-02 | 21-03 |

**AEA Port Range 21-04 to 21-07**

| AEA 1 Connector | 4 | 5 | 6 | 7 |
|---|---|---|---|---|
| Cable ID | | | | |
| Terminal or Host Type | | | | |
| Location | | | | |
| Modem Type | | | | |
| Dial In Number | | | | |
| Dial Out Number | | | | |
| AEA Port Number | 21-04 | 21-05 | 21-06 | 21-07 |

Complete all dotted line connections to the communication link type for this installation.

All eight connectors have the same cabling. Cabling for connector 0 is expanded for clarity.

**Legend:**

| | | |
|---|---|---|
| D | = | Direct - No Modem |
| N | = | Nonswitched |
| S | = | Switched |
| DM | = | Dedicated Modem |
| SM | = | Switched Modem |
| A | = | Automatic Dial |
| M | = | Manual Dial |
| T | = | ASCII Terminal |
| H | = | ASCII Host |

## CCA Cabling for Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

- • Determine the Concurrent Communication Adapters that you will use and draw in the connecting cables as indicated by the dotted lines.

- • Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheet shows all cabling to be installed in **BOLD BLACK**.

- • Use the cabling worksheet for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- • Store this worksheet with the 3174 documentation for future reference. The worksheet is necessary to perform terminal-connection problem determination. When cabling changes are made, correct the worksheet to reflect those changes.

Complete the connection for
the adapters you are cabling.



CCA 1

CCA 1
Worksheet 10A

HG 51

CCA 2

CCA 2
Worksheet 10B

HG 52

## CCA 1 — Worksheet 10A

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

To 3270 Host
(Secondary)
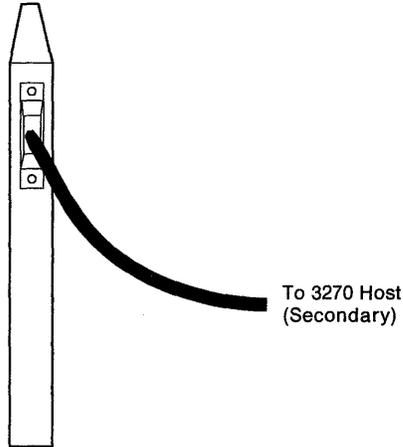
| Hardware Group | Adapter Type | Host Location | Host Protocol |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

| Host Cable ID | Modem Type | Dial Out Number |
|---|---|---|
| _____ | _____ | _____ |

## CCA 2 — Worksheet 10B

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal
connection problem determination. Store this worksheet with the 3174 documentation for future reference.
When cabling changes are made, correct this record to reflect such changes.

3174 Model   _____
3174 Location _____
3174 ID      _____

To 3270 Host
(Secondary)
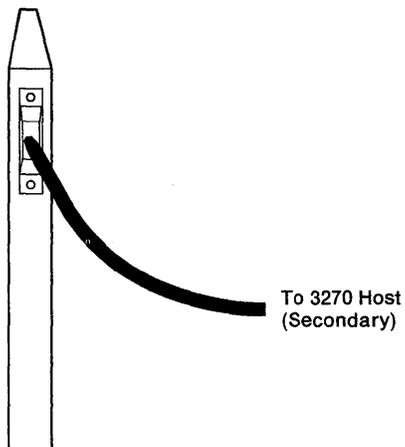
| Hardware Group | Adapter Type | Host Location | Host Protocol |
|----------------|--------------|---------------|---------------|
| _____  | _____  | _____   | _____   |

| Host Cable ID | Modem Type | Dial Out Number |
|---------------|------------|-----------------|
| _____  | _____  | _____     |

## CCA Cabling for Models 51R, 61R, 62R, and 63R

- Determine the Concurrent Communication Adapters that you will use and draw in the connecting cables as indicated by the dotted lines.

- Go to the worksheet number specified for that component and complete the worksheet indicated. Complete only the worksheets required for your hardware configuration. The accompanying worksheet shows all cabling to be installed in **BOLD BLACK**.

- Use the cabling worksheet for cable installation. **You are authorized to copy the worksheets for your convenience. Make as many copies of the worksheets as you need for site planning. Save the blank original for later planning.**

- Store this worksheet with the 3174 documentation for future reference. The worksheet is necessary to perform terminal-connection problem determination. When cabling changes are made, correct the worksheet to reflect those changes.

Complete the connection
for the adapters you are cabling.

Model 51R



CCA 1

CCA 1
Worksheet 11A

HG51

Models 61R, 62R, and 63R

CCA 1

CCA 1
Worksheet 11A

HG51

CCA 2

CCA 2
Worksheet 11B

HG52



**Note:** You can install only one Concurrent Communication Adapter in Model 63R. It will be assigned hardware group number 51.

## CCA 1 — Worksheet 11A

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

Model 51R

To 3270 Host (Secondary)

Models 61R, 62R, and 63R

To 3270 Host (Secondary)
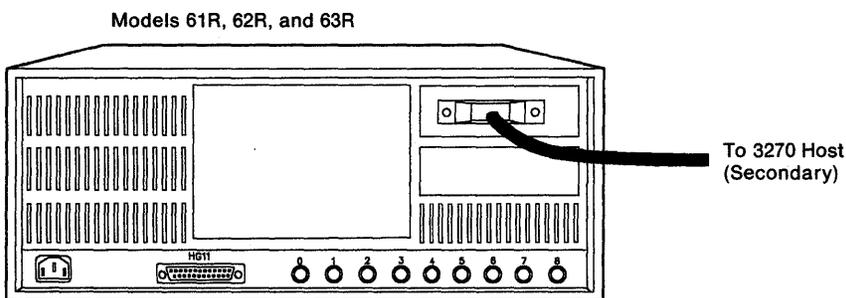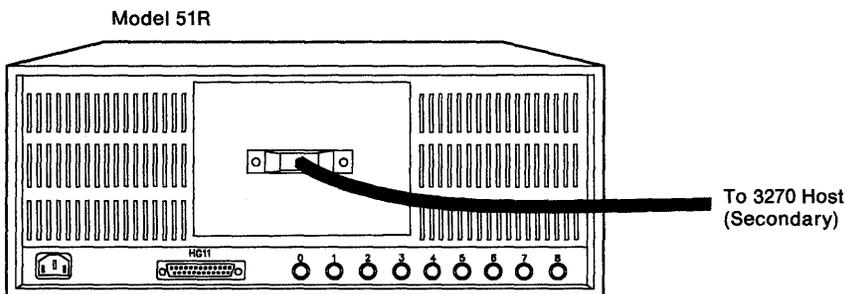
| Adapter Slot Number | Hardware Group | Adapter Interface Type | Host Location | Host Protocol |
|---|---|---|---|---|
| _____ | _____ | _____ | _____ | _____ |

| Host Cable ID | Modem Type | Dial In Number | Dial Out Number |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

## CCA 2 — Worksheet 11B

Complete this worksheet during site planning. Use this worksheet during cable installation and terminal connection problem determination. Store this worksheet with the 3174 documentation for future reference. When cabling changes are made, correct this record to reflect such changes.

3174 Model _____

3174 Location _____

3174 ID _____

Models 61R and 62R
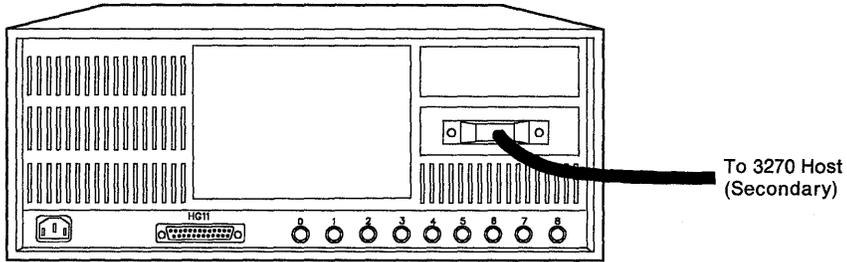
To 3270 Host
(Secondary)

| Adapter Slot Number | Hardware Group | Adapter Interface Type | Host Location | Host Protocol |
|---|---|---|---|---|
| _____ | _____ | _____ | _____ | _____ |

| Host Cable ID | Modem Type | Dial In Number | Dial Out Number |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

# Appendix H. 3174 Cabling Instructions

This appendix contains instructions for attaching terminals to the 3174 and part numbers for each type of cable and connector.

## Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

When 3174s are shipped from the factory with Terminal Multiplexer Adapters (TMAs) installed, the TMA configuration will not match the customer's configuration if the customer wants to connect terminals directly to the Terminal Adapter (TA) or 3299s to the TA.

**1** Set the Power switch to O.

**2** Press the latch-release pushbutton on the left-center edge of the front door. Gently lift and pull the door open.

**3** Familiarize yourself with the four different ways to connect terminals to the 3174. See Figure H-1 for an example.

- To the TMAs
- Directly to the TA
- Through the 3299 TMA
- To the AEA.
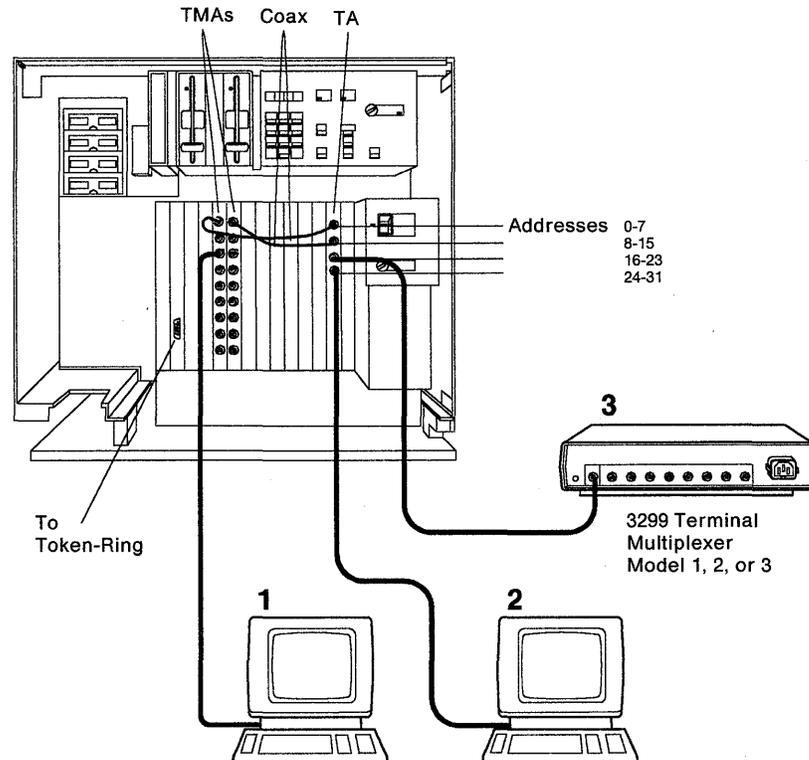


Figure    H-1.  3174 Cabling

**4** Locate the TMA cabling worksheet(s) and compare them with the TMAs installed in the 3174.

If the worksheets match the TMAs in your 3174, go to step **8**. If the worksheets do *not* match the TMAs in your 3174, continue with step **5**.

**5** You are now ready to relocate the TMAs.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices.*)

**Note:** If the configuration in the 3174 does not match the TMA cabling worksheets, TMAs have to be relocated. Steps 5 through 7 explain how to relocate the TMAs.

To relocate the TMAs, do the following:

a. Find the terminal adapter using the following list:

| TA Card Type | Slot Number |
|---|---|
| 9150 | 22 or 23 |
| 9154 | 21 |
| 9151 | TA Card Type 9151 is no longer available for customer order but is supported by all models. The card may be located in any slot (other than slot 19 which is reserved for the 2 meg card). |

b. TMAs (card type 917x) are identified by their connection to the TA. Use Table H-1 to identify the TMAs that you have.

c. Determine the first available location in the priority list to move each TMA.

Continue with step 6 to remove the TMAs.

Table    H-1. Slots for TMAs

| TMA | TA Port | Priority Slot Number |
|---|---|---|
| 1 | 0 | 15 |
| 2 | 8 | 16 |
| 3 | 16 | 11 or 23 |
| 4 | 24 | 22,23,12,17,24,13 |

**6** Disconnect the cables and remove the TMA card (type 917x) as follows:

a. Check to see if cables are attached to the TMA card. You may have to disconnect the cables before removing the card.

Before removing the cables, carefully make a chart of the cables and mark each cable (with tape) so that they can be connected back to the correct position.

b. Disconnect the cables and remove the TMA card (type 917x) by turning the thumbscrews counterclockwise until they are completely loosened.

c. Pull the card forward to remove it.

**7** Install the TMA in the new location as follows:

a. Remove the plastic tab from the new location by grasping it firmly and then pulling it up and out.

b. Insert the card into the card guides. Apply firm finger pressure to the card to ensure proper contact seating.

c. Alternately turn the thumbscrews at the top and bottom of the card clockwise until they are tight.

d. Repeat steps 6 and 7 until all TMAs match the cabling worksheets.

**8** Referring to the TMA cabling worksheets, attach the terminal cables to the TMA(s) in the following manner:

a. Arrange the cables for each TMA on the floor in front of the corresponding TMA. For instance, you would put all the cables to TMA 2 in front of slot 16.

b. Lead cables into the 3174 from the right side. If you have a Model 1R, 2R, 3R, 11R, 12R, or 13R, you can also lead cables into the 3174 through the hole in the left side. This hole is used in Model 1L and 11L to lead in channel cables. Now that the cables are matched to the corresponding TMA(s), begin cabling.

c. Cable from the bottom port (labeled 7 on the TMA) to the top port (labeled 0 on the TMA). Each cable should have an ID that matches the cable ID from the TMA cabling worksheet.

d. Use a push-and-twist clockwise motion to connect and lock the cables to the TMA connector sockets.

**9** If you have 3299 Terminal Multiplexer cabling worksheets, attach the 3299 cable(s) to the 3174 as indicated on the worksheet.

**10** If you have direct cabling worksheets, attach the terminal cables to the 3174 as indicated on the worksheets.

**You have now finished attaching cables to the 3174.**

Store these instructions in the pocket inside the front door. Close the 3174 door.

# Models 51R, 52R, 53R, 61R, 62R, and 63R

Terminals can be connected directly to the 3174 or through a 3299 Terminal Multiplexer.

**1** Set the Power switch to O.

**2** Using the cabling worksheet for Models 51R, 52R, 53R, 61R, 62R, and 63R, attach the cables to the back of the 3174 in the following manner:

a. Make sure that each cabling worksheet for Models 51R, 52R, 53R, 61R, 62R, and 63R matches the Terminal/3299 Cable ID from the cabling worksheet Models 51R, 52R, 53R, 61R, 62R, and 63R.

b. Use a push-and-twist clockwise motion to lock the cables to the 3174 connector sockets.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in the *IBM 3174 Safety Notices.)*

**You have now finished attaching cables to the 3174.** Store these instructions in the document tray underneath the 3174.

# Models 81R, 82R, 91R, and 92R

Terminals can be connected directly to the 3174 or through a 3299 Terminal Multiplexer.

**1** Set the Power switch to O.

**2** Using the cabling worksheet for Models 81R, 82R, 91R, and 92R, attach the cables to the back of the 3174 in the following manner:

a. Make sure that each cable has an ID that matches the Terminal/3299 Cable ID from the cabling worksheet for Models 81R, 82R, 91R, and 92R.

b. Use a push-and-twist clockwise motion to lock the cables to the 3174 connector sockets.

**CAUTION:**
**Do not connect or disconnect cables during periods of lightning activity.** (For translations, see Safety Notice 5 in *IBM 3174 Safety Notices.*)

**You have now finished attaching cables to the 3174.**

Retain these instructions for future use.

# Cable Part Numbers

The following table lists the part number for balun assemblies, cables, and wrap plugs.

| Table   H-2.  Part Number for Balun Assemblies | | |
|---|---|---|
| **Type** | **Part Number** | **Use** |
| IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter | 61X4584 | **Consists of:** BNC connector, coax cable, balun, telephone twisted-pair wire, and 6-pin modular plug.<br><br>**Used for:** Attaching devices with BNC jacks to telephone wiring. |
| IBM Cabling System Coaxial Red Balun assembly | 8642546 | **Consists of:** BNC connector, coax cable, red balun, IBM Cabling System wiring media, and IBM Cabling System data connector.<br><br>**Used for:** Attaching 3278-like (Category A) terminals to the IBM Cabling System. |
| IBM Cabling System Coaxial Yellow Balun assembly | 8642544 | **Consists of:** BNC connector, coax cable, yellow balun, IBM Cabling System wiring media, and IBM Cabling System data connector.<br><br>**Used for:** Attaching 3277-like (Category B) terminals to the IBM Cabling System. |
| IBM Cabling System Single Coaxial Cableless Balun assembly | 6339082 | **Consists of:** Adapter with one coax jack and one IBM Cabling System data connector without cabling between. Functionally the same as part number 8642546 (Red) without cabling.<br><br>**Used for:** Attaching 3278-like (Category A) terminals to the IBM Cabling System. |
| IBM Cabling System Double Coaxial Cableless Balun assembly | 6339083 | **Consists of:** Adapter with two coax jacks and one IBM Cabling System data connector without cabling between. Functionally the same as part number 8642546 (red) without cabling.<br><br>**Used for:** Attaching two 3278-like (Category A) terminals to the IBM Cabling System. |

| Table H-3. Part Numbers for Attachment Cables | | |
|---|---|---|
| **Type** | **Part Number** | **Use** |
| DPC to Type 3 (telephone twisted-pair) Attachment | 83X9758 | **Consists of:** DPC-T3 connector, (4.5 meters or 15 feet) of telephone twisted-pair wire, and 6-pin modular telephone plug. |
| | | **Used for:** Attaching 3174 Control Units, 3299 Models 2 and 3 Terminal Multiplexers, and new devices to telephone wiring, which meets specifications for Type 3 media. |
| DPC to IBM Cabling System accessory (2.4 meters or 8 feet) | 6339073 | **Consists of:** DPC connector (2.4 meters or 8 feet) of IBM cabling System media, and IBM Cabling System data connector. |
| | | **Used for:** Attaching 3174 Control Units, 3299 Models 2 and 3 Terminal Multiplexers, and new devices to the IBM Cabling System. |
| DPC to IBM Cabling System accessory (9 meters or 30 feet) | 6339074 | **Consists of:** DPC connector, (9 meters or 30 feet) of IBM Cabling System media, and IBM Cabling System data connector. |
| | | **Used for:** Attaching 3174 Control Units, 3299 Models 2 and 3 Terminal Multiplexers, and new devices to the IBM Cabling System. |
| Double DPC to IBM Cabling System accessory (2.4 meters or 8 feet) | 6339075 | **Consists of:** Two cables terminating in one IBM Cabling System data connector. Each cable has a DPC connector, IBM Cabling System media, and terminates in one IBM Cabling System data connector. |
| | | **Used for:** Attaching 3174 Control Units, 3299 Models 2 and 3 Terminal Multiplexers, and new devices to the IBM Cabling System. |
| 3174 TA to TMA Coax Jumper Cable | 4804698 | **Consists of:** BNC connector, (610 mm — 24 in) coax cable, and BNC connector |
| | | **Used for:** Connecting a Terminal Adapter (TA) port to a Terminal Multiplexer Adapter (TMA) input port. |

| Table   H-4.  Part Numbers for Adapter Cables | | |
|---|---|---|
| **Type** | **Part Number** | **Use** |
| Type 1 Host Communication Adapter EIA cable | 6423153 | **Consists of:** 25-pin D-shell connector, multiple-lead cable, and 25-pin D-shell connector.<br><br>**Used for:** Attaching the 3174 Type 1 Communication Adapter to a modem that communicates with a modem attached to the remote 3270 host system. |
| Type 1 Host Communication Adapter V.35 Cable | 6423325 | **Consists of:** 25-pin D-shell connector, multiple-lead cable, and 25-pin D-shell connector.<br><br>**Used for:** Attaching the 3174 Type 1 Communication Adapter to a modem that communicates with a modem attached to the remote 3270 host system. |
| Type 2 Host Communication Adapter X.21 Cable | 6168155 | **Consists of:** 25-pin D-shell connector, multiple-lead cable, and 25-pin D-shell connector.<br><br>**Used for:** Attaching the 3174 Type 2 Communication Adapter to a modem that communicates with a modem attached to the remote 3270 host system. |
| Token-Ring Adapter Cable | 6165837 | **Consists of:** 9-pin D-shell connector, multiple-lead cable, and IBM Cabling System data connector.<br><br>**Used for:** Attaching the 3174 Token-Ring Adapter to the IBM Cabling System or IBM 8228 Multistation Access Unit. |

| Table H-5. Part Numbers for Wrap Plugs | | |
|---|---|---|
| **Type** | **Part Number** | **Use** |
| V.35 Wrap Plug | 6423419 | **Used for:** Testing the Type 1 Communication Adapter and the following Interface cables:<br><br>6423153   6423326<br>6423157   6423327<br>6423158   6423328<br>6423325 |
| X.21 Wrap Plug | 6423420 | **Used for:** Testing the Type 2 Communication Adapter |
| V.35 Cable Wrap Plug | 61X4603 | **Used for:** Testing the following early production interface cables with one Test/Operate switch:<br><br>6423157   6423326<br>6423158   6423327<br>6423325   6423328 |
| ASCII Adapter Wrap Plug | 61X4602 | **Used for:** Testing the 3174 ASCII Adapter ports. |

# Cable Connector Types

Four different types of connectors can be used with 3174 units and terminals. This section shows the different connectors.

**DPC-T3 Connector**
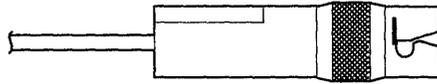
The DPC-T3 connector is found on the IBM 3270 Dual Purpose Connector to Twisted Pair (DPC-T3) Adapter and is used to connect 3174 Control Units, 3299 Terminal Multiplexer Models 2 and 3, and new terminals directly to telephone wiring that meets the specifications for Type 3 media.

**DPC Connector**
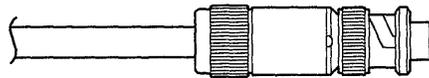
The DPC connector is found on the IBM Cabling System accessories. It is used to connect the 3174 Control Units, 3299 Terminal Multiplexers Model 2 and 3 and terminals to the IBM Cabling System.

**BNC Connector**
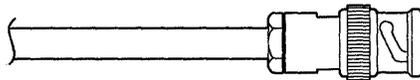
The BNC connector is found on coaxial wiring and the IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter. It is used to connect controllers, terminal multiplexers, and terminals directly to coaxial cable. The IBM/ROLM 3270 Coax-to-Twisted-Pair Adapter allows you to connect controllers, terminal multiplexers, and terminals, normally connected to coaxial cable, to telephone wiring.

**6-pin Modular Telephone Plug**
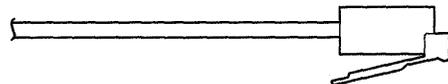
The 6-pin Modular Telephone Plug connector is found on telephone wiring, the IBM/ROLM Coax-to-Twisted-Pair accessory, and the IBM DPC-T3 adapter. It is used to connect directly to telephone wiring and to the terminal connectors on the 3299 Terminal Multiplexer Model 3.

The DPC T3, DPC, and BNC connectors will all connect and lock on the DPC jacks found on the 3174s, the 3299 Model 2, the 3299 Model 3 input jack, and most new terminals.
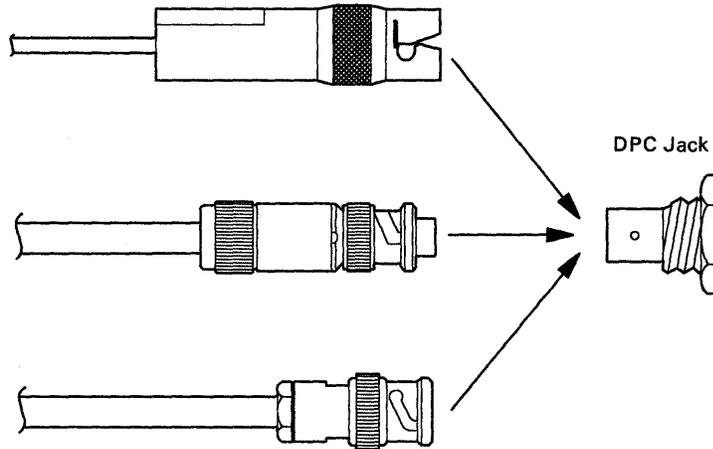
DPC Jack

The BNC jack accepts only the BNC connector. Note that the BNC jack is shorter than the DPC jack.

BNC Jack
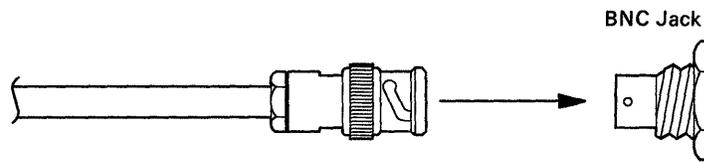
# List of Abbreviations

## A

**A.** (1) Ampere. (2) Attention.

**ac.** Alternating current.

**AEA.** Asynchronous Emulation Adapter.

**AID.** Attention identifier.

**ARC.** Adapter return code.

**ASCII.** American National Standard Code for Information Interchange.

**AWG.** American Wire Gauge.

## B

**B.** Busy.

**BB.** Begin bracket.

**bps.** Bits per second.

**BSC.** Binary synchronous communication.

**Btu.** British thermal unit.

**BTU.** Basic transmission unit.

## C

**C.** Celsius.

**C&D.** Cause and diagnostic (codes).

**CC.** Control check, Chain Command (flag).

**CCITT.** International Telegraph and Telephone Consultative Committee.

**CD.** (1) Compact disk. (2) Change direction.

**CE.** (1) IBM Customer Engineer. (2) Correctable error. (3) Channel-end.

**cfm.** Cubic feet per minute.

**coax.** Coaxial (cable).

**CSU.** Customer setup.

**CTS.** Clear to Send.

**CUT.** Control unit terminal.

## D

**D.** Display.

**dB.** Decibel.

**DB.** (1) Data base. (2) Device Busy.

**DC.** (1) Data communication. (2) Direct current.

**DCE.** Data-circuit-terminating equipment.

**DM.** Disconnect mode.

**DPC.** Dual-purpose connector.

**DSR.** Data set ready.

**DTE.** Data terminal equipment.

**DTR.** Data terminal ready.

## E

**EIA.** Electronic Industries Association.

## F

**F.** Fahrenheit.

**FCC.** Federal Communications Commission.

**FM.** (1) Frequency modulation. (2) Function management. (3) Field mark.

**ft.** Foot (or feet).

## H

**H.** Height.

**Hz.** Hertz.

## I

**I.** Information (format).

**ID.** Identification, identifier.

**in.** inch (or inches).

**I/O.** Input/output.

## K

**k.** 1000.

**K.** 1024.

**kg.** Kilogram.

**kVA.** Kilovolt ampere.

## L

**l.** Coaxial cable type for indoor or outdoor installations.

**L.** Left.

**lb.** Pound.

**LIC.** Last in chain.

## M

**m.** Meter (or meters).

**max.** Maximum.

**MES.** Miscellaneous Equipment Specification.

**min.** Minimum, minute.

**mm.** Millimeter (or millimeters).

**modem.** Modulator-demodulator.

## N

**NEMA.** National Electrical Manufacturer's Association.

**No.** Number.

**NTT.** Nippon Telephone and Telegraph.

**NUM.** Numeric.

## O

**OEM.** Original equipment manufacturer.

## P

**P.** Printer, protected.

**PA.** (1) Program access. (2) Program attention.

**PBX.** Private branch exchange.

**PC.** Personal Computer.

**pF.** Picofarad.

**PF.** Program function.

**PTT.** Postal Telephone and Telegraph Administration.

**PVC.** Permanent virtual circuit.

## R

**R.** Rear, row.

**rel.** Relative.

**Req.** Request.

**RFI.** Radio-frequency interference.

**rms.** Root-mean-square.

**RPQ.** Request for price quotation.

**rt.** Right.

**RTS.** Request to send.

## S

**S.** Sequenced (format), side.

**SCR.** Silicone-controlled rectifier.

**SCS.** SNA character string.

**SDLC.** Synchronous Data Link Control.

**SM.** Status modifier.

**SNA.** Systems Network Architecture.

**SUB.** Substitute.

# T

**TA**. Terminal adapter.

**TMA**. Terminal multiplexer adapter.

# U

**U**. Unprotected.

**U.S**. United States.

# V

**V**. Volt.

# Glossary

This glossary includes terms and definitions from the *IBM Dictionary of Computing: Information Processing, Personal Computing, Telecommunications, Office Systems, IBM-specific Terms*, SC20-1699.

The terms in this glossary are defined here as they apply to the 3270 Information Display System.

## A

**access unit.** In an IBM Token-Ring Network, a wiring concentrator. See *multistation access unit*.

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

**address.** (1) A value that identifies a register, a particular part of storage, a data source, or a data sink. The value is represented by one or more characters. (2) To refer to a device or an item of data by its address. (3) In word processing, the location, identified by an address code, of a specific section of the recording medium or storage. (4) The location in the storage of a computer where data is stored. (5) In data communication, the unique code assigned to each device or work station connected to a network.

**AEA port.** A communication connector on the Asynchronous Emulation Adapter (AEA).

**ambient.** Environmental.

**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.

**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.

**attention identifier (AID).** A code in the inbound 3270 data stream that identifies the source or type of data that follows. A character in a data stream indicating that the user has pressed a key, such as Enter, that requests an action by the system.

**attenuation.** A decrease in magnitude of current, voltage, or power of a signal in transmission between points. It may be expressed in decibels or nepers.

## 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 connecting balanced (for instance, twisted-pair) cables to unbalanced (for instance, coaxial) cable by matching the electrical characteristics of the cables.

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

**bridge.** (1) A functional unit that connects two local area networks (LANs) that use the same logical link control (LLC) procedure but may use different medium access control (MAC) procedures. (2) See also *backbone* and *gateway*.

**Note:** A bridge connects networks or systems of the same or similar architectures, whereas a gateway connects networks or systems of different architectures.

## 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.

**category A terminals.** Terminals that can be attached to the 3174 Establishment Controller and to type A adapters in the 3274 Control Unit. For example, the 3278 and 3279 display stations, the 3287 Models 1, 1C, 2, and 2C, the 3262 Models 3 and 13, and the 3289 Models 1 and 2 printers.

**category B terminals.** Terminals that can be attached to type B adapters in the 3274 Control Unit, for example, the 3277 Display Station and the 3284, 3286, 3287 Models 1 and 2, and 3288 printers.

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

**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 set.** (1) A defined collection of characters. (2) A group of characters used for a specific reason, for example, the set of characters a printer can print. (3) The collection of graphic characters required to support a specific language.

**Clear to Send (CTS) flow control.** A procedure for a communicating device to signal its readiness to receive data by raising the CTS lead on an EIA 232D interface.

**cluster.** A station that consists of a control unit (a cluster controller) and the terminals attached to it.

**cluster controller.** A device that can control the input/output operations of more than one device connected to it. A cluster controller may be controlled by a program stored and executed in the unit, for example, the IBM 3601 Finance Communication Controller. Or, it may be entirely controlled by hardware, for example, the IBM 3272 Control Unit. See also *cluster* and *cluster controller node.* Synonymous with *cluster control unit.*

**cluster controller node.** A peripheral node that can control a variety of devices. See also *host node, NCP node,* and *terminal node.*

**cluster control unit.** Synonym for cluster controller.

**coaxial cable.** A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

**communication adapter.** (1) A circuit card with associated software that enables a processor,

controller, or other device to be connected to a network. (2) See *EIA communication adapter, V.35 communication adapter,* and *X.21 communication adapter.*

**communication controller.** (1) A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program processed in a processor to which the controller is connected or by a program executed within the device. (2) A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network. (3) See also *cluster controller, communication controller node,* and *transmission control unit.*

**communication controller node.** A subarea node that does not contain a system services control point (SSCP).

**communication control unit.** A communication device that controls transmission of data over lines in a network.

**component.** (1) Hardware or software that is part of a functional unit. (2) A functional part of an operating system, for example, the scheduler or supervisor. (3) In systems with VSAM, a named, cataloged collection of stored records, such as the data component or index component of a key-sequenced file or alternate index. (4) In System/38 graphics, the representation of a data group on a chart. (5) See *terminal component* and *solid state component.*

**configuration.** The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term *configuration* may refer to a hardware configuration or a software configuration. See also *system configuration.*

**connector.** A means of establishing electrical flow.

**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. The 3174 is an example of a control unit.

**control unit terminal (CUT).** A terminal that relies on the 3174 to interpret the data stream. Examples are the 3178, 3179, 3278 Model 2, and 3279 Model S2A.

**control unit terminal (CUT) mode.** A host-interactive mode that enables an IBM 3270 Personal Computer customized in this mode to run only one session emulating a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

**conversion.** (1) In programming languages, the transformation between values that represent the same data item but belong to different data types. Information may be lost as a result of conversion because accuracy of data representation varies among different data types. (2) The process of changing from one method of data processing to another or from one data processing system to another. (3) The process of changing from one form of representation to another, for example, to change from decimal representation to binary representation.

# D

**data circuit-terminating equipment (DCE).** In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line.

**Notes:**

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.

2. A DCE may perform other functions that are usually performed at the network end of the line.

**data processing (DP).** The systematic performance of operations upon data; for example, handling, merging, sorting, computing.

**data stream.** (1) All data transmitted through a data channel in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format. See also *data stream format.*

**data stream format.** In SNA, the format of the data elements (end-user data) in the request unit (RU). See also *3270 data stream* and *SNA character string (SCS).*

**data terminal equipment (DTE).** That part of a data station that serves as a data source, data sink, or both.

**Data Terminal Ready (DTR) flow control.** A procedure for a communicating device to signal its readiness to receive data by raising the DTR lead on an EIA 232D interface.

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

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

**dielectric.** Nonconductor of direct electric current.

**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 frame.** (1) In computer graphics, an area in storage in which a display image can be recorded. (2) In computer micrographics, an area on a microform in which a display image can be recorded.

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

**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.*

**event.** (1) An occurrence or happening. (2) An occurrence of significance to a task; for example the completion of an asynchronous operation, such as an input/output operation.

# F

**file.** A named set of records stored or processed as a unit.

**fixed disk.** A rigid magnetic disk used in a fixed disk drive.

**frame.** (1) The portion of a tape, on a line perpendicular to the reference edge, on which binary characters can be written or read simultaneously. Synonymous with *tape row*. (2) A housing for machine elements. (3) The hardware support structure, covers, and all electrical parts mounted therein that are packaged as one entity for shipping. (4) A formatted display. See *display frame*.

**full duplex.** Synonym for *duplex*.

# G

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

**Note:** A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures.

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

# H

**hertz (Hz).** A unit of frequency equal to 1 cycle per second.

**hexadecimal.** (1) Pertaining to a selection, choice, or condition that has 16 possible values or states. (2) Pertaining to a fixed-radix numeration system, with radix of 16. (3) Pertaining to a numbering system with base of 16; valid numbers use the digits 0 through 9 and characters A through F, where A represents 10 and F represents 15.

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

**host node.** (1) A node at which a host processor is located. (2) In SNA, a subarea node that contains a system services control point (SSCP); for example, a System/370 computer with OS/VS2 and ACF/TCAM.

**host system.** (1) A data processing system used to prepare programs and operating environments for use on another computer or controller. (2) The data processing system to which a network is connected and with which the system can communicate. (3) The controlling or highest-level system in a data communication configuration; for example, a System/38 is the host system for the work stations connected to it.

# I

**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.

**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.

# J

**jack.** A connecting device to which a wire or wires of a circuit may be attached and that is arranged for insertion of a plug.

# L

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

**lobe receptacle.** In the IBM Token-Ring Network, an outlet on an access unit for connecting a lobe.

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

**location.** With reference to a 3174, a place within the 3174 chassis where a particular card or adapter is inserted.

**loop.** A closed unidirectional signal path connecting input/output devices to a network.

# M

**main storage**. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent processing.

**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.

**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*.

**modem (modulator/demodulator)**. A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

**multistation access unit**. In the IBM Token-Ring Network, a wiring concentrator that can connect up to eight lobes to a ring.

# N

**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.

**null modem**. A device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D cable. The null modem does the crossing-over of the appropriate EIA 232D leads required for the direct connection of a terminal or computer to an AEA port.

# O

**open**. (1) To make an adapter ready for use. (2) A break in an electrical circuit.

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

# P

**parallel**. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (4) Pertaining to the simultaneity of two or more processes. (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (6) Contrast with *serial*.

**path**. In a network, a route between any two nodes.

**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.

**printer authorization matrix**. A matrix stored in the control unit that establishes printer assignment and classification.

**private branch exchange (PBX)**. An automatic or manual private telephone exchange for transmission of calls to and from the public telephone network.

**program access (PA) key**. On a display device keyboard, a key that produces a call to a program that performs display operations. See also *program function (PF) key*.

**program function (PF) key**. On a display device keyboard, a key that passes a signal to a program to call for a particular display operation. See also *program access (PA) key*.

**protocol**. (1) A set of semantic and syntactic rules that determine the behavior of functional units in achieving communication. (2) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

**put**. In 3174 central site customizing, to store data from the working copy into a library member.

# R

**receptacle**. See *lobe receptacle*.

**remote**. Pertaining to a system, program, or device that is accessed through a telecommunication line.

**request for price quotation (RPQ)**. An alteration or addition to the functional capabilities that the control unit provides.

**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.

**routing.** (1) The assignment of the path by which a message will reach its destination. (2) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

# S

**serial.** (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (4) Contrast with *parallel*.

**service clearance.** Minimum space required to allow working room for the machine operator and/or the customer engineer for servicing the unit.

**simulation.** (1) The representation of selected characteristics of the behavior of one physical or abstract system by another system. In a digital computer system, simulation is done by software; for example, (a) the representation of physical phenomena by means of operations performed by a computer system, and (b) the representation of operations of a computer system by those of another computer system. (2) Contrast with *emulation*.

**SNA character string (SCS).** A character string composed of EBCDIC controls, optionally intermixed with end-user data, that is carried within a request/response unit.

**solid-state component.** A component whose operation depends on control of electric or magnetic phenomena in solids, for example, a transistor, crystal diode, or ferrite core.

**staging adapter.** (1) An addition to a System/370 Model 158 or 168 Integrated Storage Control (ISC) feature that enables the integrated storage control to operate in a 3850 Mass Storage System. (2) An IBM 3850 Model 3 Storage Control, which is a 3830 Model 2 Storage Control that has been modified to operate in a 3850 Mass Storage System.

**station.** (1) An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line.

(2) A location in a device at which an operation is performed, for example, a read station. (3) In SNA, a link station.

**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.

**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*.

**telecommunication control unit.** See *communication control unit*.

**terminal.** In data communication, a display station or printer capable of sending or receiving information.

**terminal adapter (TA).** An adapter that provides control for a maximum of 32 terminals; each BNC connector (four in all) on the terminal adapter can control either one terminal that is directly attached or as many as eight terminals that are attached through a

terminal multiplexer adapter (located in the 3174) or a 3299 Terminal Multiplexer (located outside the 3174).

**terminal component.** A separately addressable part of a terminal that performs an input or output function, such as the display component of a keyboard-display device or a printer component of a keyboard-printer device.

**terminal emulation.** The capability of a microcomputer, personal computer, 3270 CUT mode display station, 3270 printer, ASCII display station, or ASCII printer to operate as if it were a particular type of terminal linked to a processing unit and to access data.

**terminal multiplexer.** A device, such as the 3299 Terminal Multiplexer, for interleaving the signals for many devices onto a single coaxial cable.

**terminal multiplexer adapter (TMA).** This adapter is connected to the terminal adapter in the 3174 and provides control for a maximum of eight terminals.

**terminal node.** (1) In a hierarchical data base, a node that has no subordinate records or segments. (2) In SNA products, a peripheral node that is not user-programmable and has less processing capability than a cluster controller node. Examples are nodes consisting of the IBM 3277 Data Station, 3767 Communication Terminal, 3614 Consumer Transaction Facility, and 3624 Consumer Transaction Facility.

**terminal port.** (1) In a network, the functional unit of a node through which data can enter or leave the network. (2) The part of a processor that is dedicated to a single data channel for the purpose of receiving data from or transferring data to one or more external or remote devices.

**token.** In a local area network, the symbol of authority passed among data stations to indicate the station temporarily in control of the transmission medium.

**Note:** A token is a particular message or bit pattern that signifies permission to transmit.

**Token-Ring Network.** (1) A ring network that allows unidirectional data transmission between data stations by a token-passing procedure over one transmission medium so that the transmitted data returns to the transmitting station. (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

**transmission control unit (TCU).** A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit, for example, the IBM 2702 and 2703 Transmission Controls. Contrast with *communication controller*. Synonymous with *telecommunication control unit*.

**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.

# 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

**write.** To make a permanent or transient recording of data in a storage device or on a data medium.

# 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.

# Numerics

**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.

# Index

**IBM 3174 Establishment Controller**
**Site Planning**

**Publication No. GA23-0213-4**

This manual is part of a library that serves as a reference source for systems analysts, programmers, and operators of IBM systems. You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

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

Possible topics for comment are:

Clarity     Accuracy     Completeness     Organization     Coding     Retrieval     Legibility

If you wish a reply, give your name, company, mailing address, date, and location of your local IBM branch office:

_____

_____

_____

_____

_____

What is your occupation? _____

Number of latest Newsletter associated with this publication: _____

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments or you may mail directly to the address in the Edition Notice on the back of the title page.)

GA23-0213-4

**Reader's Comment Form**

IBM®

IBM