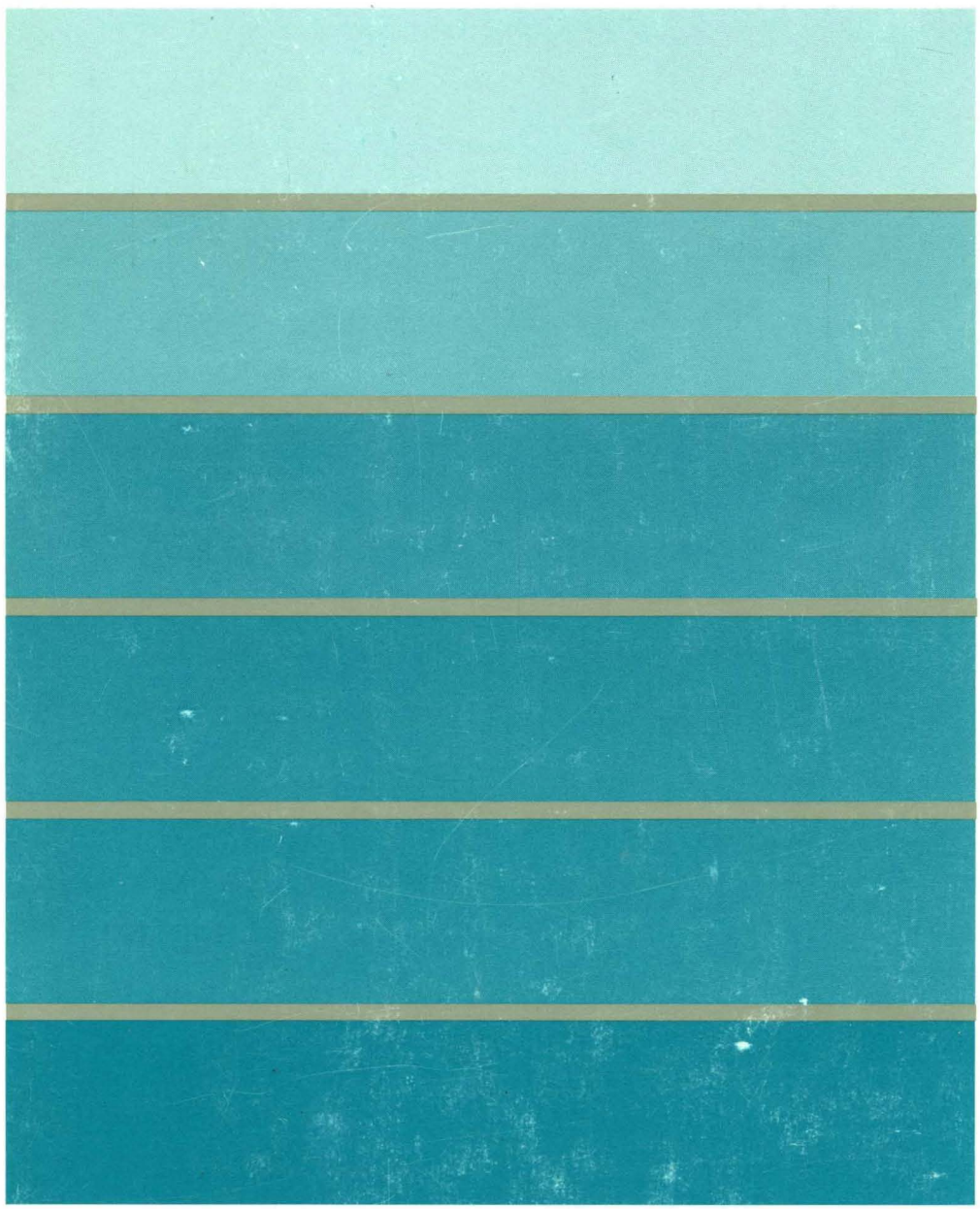
3174 Establishment Controller

SY27-2572-04

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Maintenance Information



3270 Information Display System

3174 Establishment Controller

SY27-2572-04

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Maintenance Information

Fifth Edition (May 1989)

This major revision obsoletes and replaces SY27-2572-3. See "Summary of Changes" on page xxv for the changes made to this manual. Changes or additions to text and illustrations are indicated by a vertical line to the left of the change. The drawings and specifications contained herein shall not be reproduced in whole or in part without written permission.

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United States **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:

Configuration Support A and S

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

Configuration Support B

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

To Install Features or Convert Models on the 3174:

Encrypt/Decrypt Adapter Installation and Removal Instructions, GA23-0262
Fixed Disk Installation and Removal Instructions, GA27-3864
Diskette Drive Installation and Removal Instructions, GA23-0263
Terminal Multiplexer Adapter Installation and Removal Instructions, GA23-0265
Model Conversion Instructions, GA23-0295
Token-Ring Network Feature Installation and Removal Instructions, GA23-0329
Storage Expansion Feature Installation and Removal Instructions, GA23-0330
Communications Adapter Installation and Removal Instructions, GA27-3830
Asynchronous Emulation Adapter Installation and Removal Instructions, GA23-0341
Concurrent Communication Adapter Installation and Removal Instructions, GA27-3851

To Plan for and Use the Asynchronous Emulation Adapter Feature:

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

To Use the Multiple Logical Terminals Function:

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

To Perform Problem Determination:

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

To Obtain Data Stream Programming and Reference Information:

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

To Perform Maintenance (Service Personnel):

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

To Find Translations of Safety Notices:

Safety Notices, GA27-3824

Preface

This manual identifies the tasks involved in maintaining the IBM 3174 Establishment Controller Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R and provides the information needed to keep these controllers in, or to restore them to, good working order.

Who This Book Is For

This book is for the product-trained and support-trained IBM service representative who maintains the 3174 Establishment Controller Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R

The maintenance procedures described in this manual represent a part of the overall support structure for the 3174 Establishment Controller. This support structure, which begins at the 3174 operator level, is described briefly below.

3174 Operator

The 3174 operator performs initial problem isolation and recording of the 3174 failure indications by following the procedures in the *3174 User's Guide* or the *3174 Customer Extended Problem Determination* manual. If the problem is other than a customer operating procedure or customer-supplied power, the operator requests IBM service.

Product-Trained Service Representative

The product-trained service representative performs the maintenance procedures contained in this manual to isolate a problem to a field replaceable unit (FRU), a communication failure, a data stream problem, an attached-device failure, or a specific cause, such as a defective cable. If the maintenance package cannot isolate or correct the fault, the product-trained service representative requests assistance from the next level of the support structure.

Support-Trained Service Representative and Area-Designated Specialist

The support-trained service representative and the area-designated specialist use their in-depth knowledge of telecommunication and of the product to continue problem determination beyond the scope of the maintenance manual.

How This Book Is Organized

This book has six chapters:

Chapter 1, General Information, describes the service representative's maintenance approach to 3174 problem analysis and repair. This chapter also contains examples of 3174 controller configurations, and a description of models and features, operating procedures, environmental restrictions, and special tools.

Chapter 2, Diagnostic Information, contains symptom charts, maintenance analysis procedures (MAPs), offline and online tests, general procedures, and 370/OLTs.

Chapter 3, Repair Information, contains locations, card-plugging charts, an interrupt level chart, and removal and replacement procedures.

Chapter 4, Installation, contains information on how to install the local (channel-attached) model of the 3174, the Models 1L and 11L. (The chapter applies to these models only.)

Chapter 5, Safety Inspection Guide, contains some of the information used to determine whether a machine can be placed on an IBM maintenance agreement.

Chapter 6, Parts Catalog, contains illustrations and part numbers for the 3174.

The book has three appendixes:

Appendix A contains information about the IBM Cabling System and 3299 Terminal Multiplexer reference information.

Appendix B contains information about the X.25 feature.

Appendix C contains information about the X.21 feature.

Abbreviations and terms used in the manual are defined in the back, preceding the Index.

Contents

Figures

Tables

Summary of Changes

Fifth Edition (May 1989)

This revision of the *IBM Establishment Controller Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Maintenance Information* contains the following new information:

- The title of the 3174 was changed from Subsystem Control Unit to Establishment Controller.
- The name of this manual was changed to include the new models.
- Release A5, S5, and B1 microcode changes
- 2.4MB diskette drives
- 16/4Mbps Token-Ring
- Multi-Host Support
- Concurrent Communication Adapter
- 2MB Base Storage.

Technical changes to the text and illustrations are indicated by a vertical line to the left of the change.

Chapter 1. General Information

Introduction

This chapter provides the following general information about the IBM 3174 Establishment Controllers Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R:

- Service strategy
- Configurations
- General description
  - Field replaceable unit (FRU) descriptions
  - Hardware group numbers
  - Type numbers
  - FRU identification
  - Status code description
  - 3174 event log description
  - Diskettes
  - Fixed Disk(s)
  - Operator panel
- Token-Ring Network
- Asynchronous Emulation Adapter
- Power supply description
- Central Site Customizing
- Initial Microcode Load (IML)
  - Normal IML
  - Alt 1 IML
  - Alt 2 IML
- Environmental restrictions
- Special tools and test equipment.

Service Strategy

Figure 1-1 shows the strategy that the IBM service representative uses to perform problem analysis and repair for the 3174 Establishment Controller.

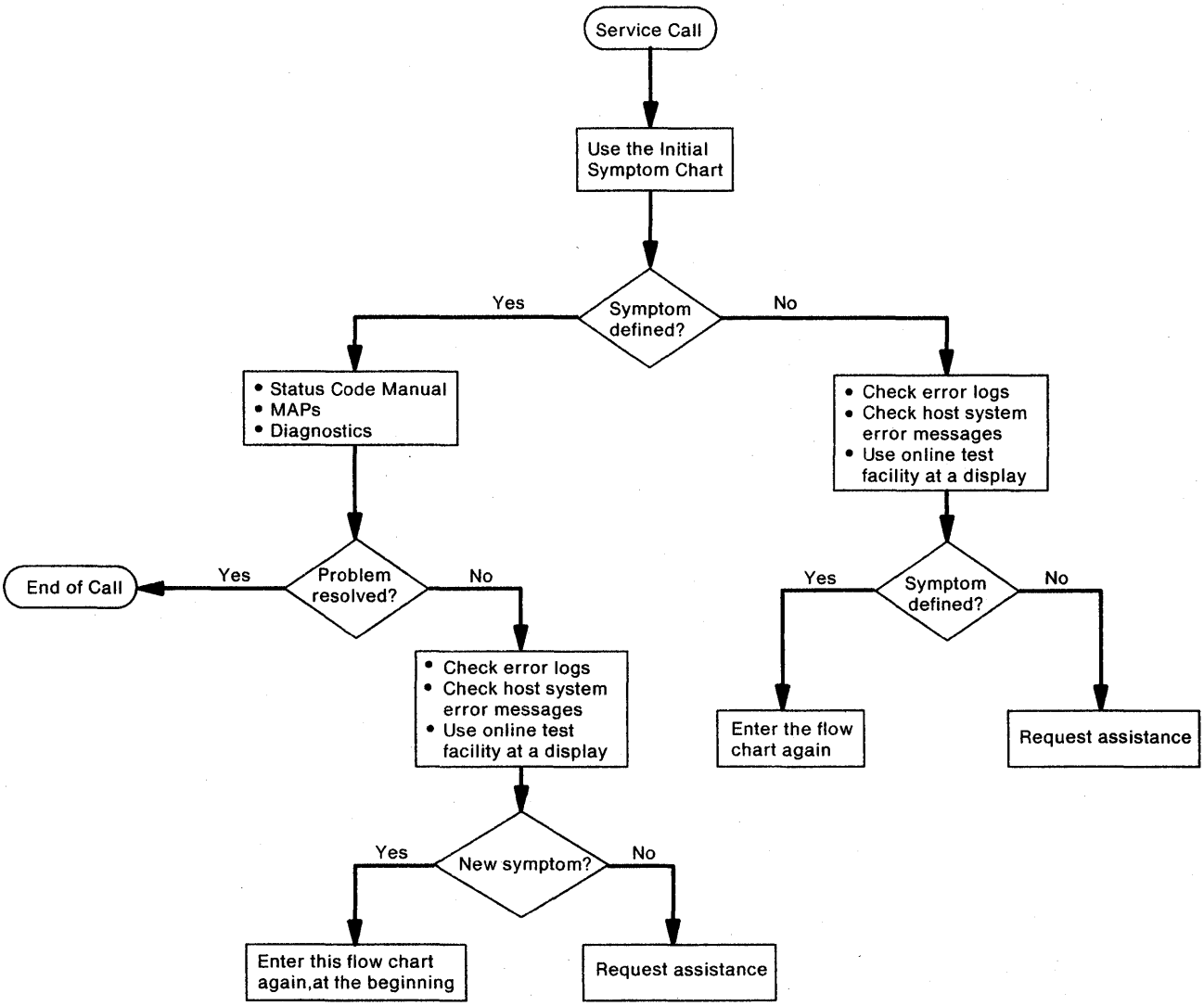


Figure 1-1. 3174 Service Strategy

The approach shown in Figure 1-1 applies to all problems that occur on the controller. In the case of Token-Ring problems, if the failure appears to be outside of the controller, the customer should use the *IBM Token-Ring Network Problem Determination Guide* and the IBM Token-Ring Network Problem Diagnostic test. This diagnostic is controlled from an IBM Personal Computer that is attached to the ring.

3174 Configurations

This section contains information about 3174 models, features, host communication configurations, and terminal attachment configurations.

3174 Hardware Configurations

The 3174 Establishment Controllers are available in a base-hardware configuration. Additional features can be ordered and set up by the customer. The controllers are compatible with Systems Network Architecture (SNA) and non-SNA. The eight models are:

- Models 1L and 11L Channel-attached (local)
- Models 1R and 11R Telecommunication-attached (remote) (EIA/V.35)
- Models 2R and 12R Telecommunication-attached (remote) (X.21)
- Models 3R and 13R Token-Ring-attached.

A description of the base and feature hardware and host communication configurations follows:

- Base Hardware

  Channel Adapter (Models 1L and 11L only) Supports SNA or non-SNA

Terminal Adapter	Four directly attached terminals, or up to 32 terminals through four 3299s or Terminal Multiplexer Adapters (TMAs)
Storage Size	1 megabyte (MB) (1 048 576 bytes) Models 1L, 1R, 2R, and 3R (Either two 512KB storage cards are installed or one 1MB card.)
	2MB Models 11L, 11R, 12R, and 13R
Diskette Drive	5.25-inch diskette (1.2MB on Models 1L, 1R, 2R, and 3R, 2.4MB on Models 11L, 11R, 12R, and 13R)

- Additional Hardware Features
  - A maximum of four Terminal Multiplexer Adapter (TMA) cards. (Eight terminals attach to each TMA card.)
  - One additional diskette drive.

    Note: A second diskette drive or a fixed disk drive is required to support distributed function terminals (DFTs) that need a Downstream Load (DSL) or the Asynchronous Emulation Adapter (AEA).
  - A maximum of two fixed disk drives (one fixed disk drive is recommended for Central Site Library controllers).
  - Storage Features: 1MB or 2MB. 512KB is available for Models 1L, 1R, 2R, and 3R.
  - One IBM Token-Ring Network Gateway feature.

    Note: This feature includes a Token-Ring adapter card and a set of Control and Utility diskettes (Configuration Support S or B). The Token-Ring Gateway feature should not be installed in Models 1L, 1R, 2R, and 3R if the Asynchronous Emulation Adapter is installed.
  - A maximum of three Asynchronous Emulation Adapter (AEA) cards. Eight ASCII terminals, modems, or hosts attach to each AEA card.
  - Type 1 or Type 2 Communication Adapter.
  - Two Concurrent Communication Adapters.
  - One Token-Ring Adapter.

- Host Communication Configurations.

  3174 Models 1L and 11L with only the base hardware installed communicate with the host processor through a byte multiplexer, selector, or block multiplexer channel.

  3174 Models 1L and 11L connect to the following host processors: 308x, 309x, 4361, 4381, 9370, and AS400.

  3174 Models 1R, 2R, 11R, and 12R communicate with the host processor using Synchronous Data Link Control (SDLC) or binary synchronous communication (BSC) over duplex or half-duplex communication facilities. The line control method the controller uses is set up during configuration. The Details are available in the *3174 Customizing Guide*, GA23-0214.

  3174 Models 1R, 2R, 11R, and 12R connect to the following host processors: System 36 (SDLC only), System 38 (SDLC only), 308x, 3090, 4361, 4381, 8100 (DPPX SNA), AS400, and 9370.

  3174 Models 3R and 13R communicate with the host processor through a gateway device such as the 3174 Models 1L and 11L with the gateway feature or a 3725 with gateway NCP.

  3174 Models 3R and 13R connect to the following host processors: System 36 (SDLC only), System 38 (SDLC only), 308x, 3090, 4361, 4381, 8100 (DPPX SNA), and 9370.

Table 1-1. 3174 Base and Optional Hardware

Feature	1L	1R	2R	3R	11L	11R	12R	13R
Channel Adapter	B	X	X	X	B	X	X	X
Terminal Adapter	B	B	B	B	B	B	B	B
Storage Size 1MB	B	B	B	B	X	X	X	X
Storage Size 2MB	O	O	O	O	B	B	B	B
Diskette Drive 1	B	B	B	B	B	B	B	B
Terminal Multiplexer Adapter	O	O	O	O	O	O	O	O
Diskette Drive 2	O	O	O	O	O	O	O	O
Fixed Disk Drive 1	O	O	O	O	O	O	O	O
Fixed Disk Drive 2	O	O	O	O	O	O	O	O
Token-Ring Gateway	O	O	O	X	O	O	O	X
Token-Ring Adapter	O	O	O	B	O	O	O	B
Asynchronous Emulation Adapter	O	O	O	O	O	O	O	O
512KB Storage Expansion	O	O	O	O	X	X	X	X
1MB Storage Expansion	O	O	O	O	O	O	O	O
2MB Storage Expansion	O	O	O	O	O	O	O	O
Type 1 Communication Adapter	O	B	X	O	O	B	X	O
Type 2 Communication Adapter	O	X	B	O	O	X	B	O
Encrypt/Decrypt	X	O	O	O	X	X	X	X
Type 1 Concurrent Communication Adapter	O	O	O	O	O	O	O	O
Type 2 Concurrent Communication Adapter	O	O	O	O	O	O	O	O

Note: **O** = Optional **B** = Base **X** = Not available on this model.

Terminal Adapter Attachment Configurations

Terminals attach to the terminal adapter by three different methods:

1. Directly to a port on the terminal adapter
2. Through a port on a TMA card
3. Through a 3299 Terminal Multiplexer.

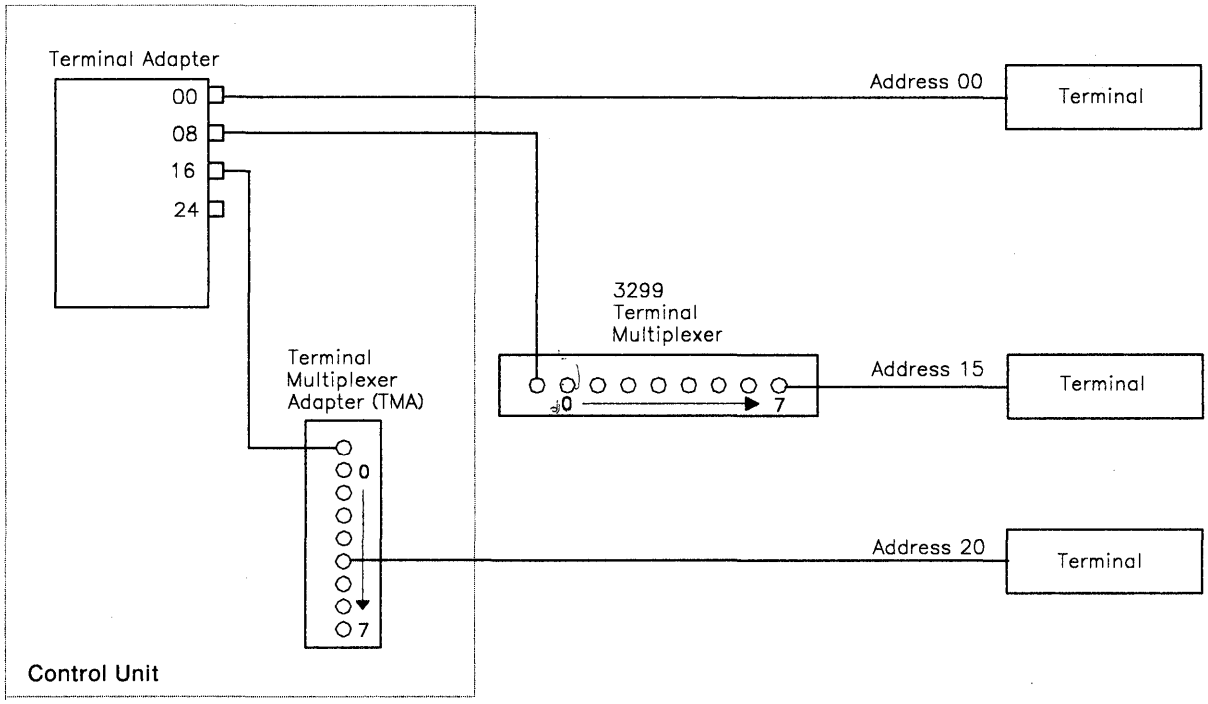


Figure 1-2. Block Diagram of 3174 Terminal Adapter – Attached Terminals

Table 1-2 shows 15 attachment configurations with the maximum number of terminals attached for each configuration. Any combination of TMAs and 3299s can be used. See Figure 1-3 on page 1-8 for an example of a typical terminal attachment configuration.

Table 1-2. 3174 Attachment Configurations

Terminal Adapter Installed	TMAs Installed	3299s Installed	Terminals Attached to Terminal Adapter	Terminals Attached to TMA	Terminals Attached to 3299s	Total Terminals Attached
1	0	0	4	0	0	4
1	1	0	3	8	0	11
1	2	0	2	16	0	18
1	3	0	1	24	0	25
1	4	0	0	32	0	32
1	0	1	3	0	8	11
1	0	2	2	0	16	18
1	0	3	1	0	24	25
1	0	4	0	0	32	32
1	1	1	2	8	8	18
1	1	2	1	8	16	25
1	1	3	0	8	24	32
1	2	1	1	16	8	25
1	2	2	0	16	16	32
1	3	1	0	24	8	32

Figure 1-3 shows an example of the three ways in which terminals attach to the 3174 Terminal Adapter. This particular configuration allows a maximum of 25 terminals, where:

- Eight terminals attach to each TMA card.
- One terminal attaches directly to the terminal adapter.
- Eight terminals attach to the 3299 Terminal Multiplexer.

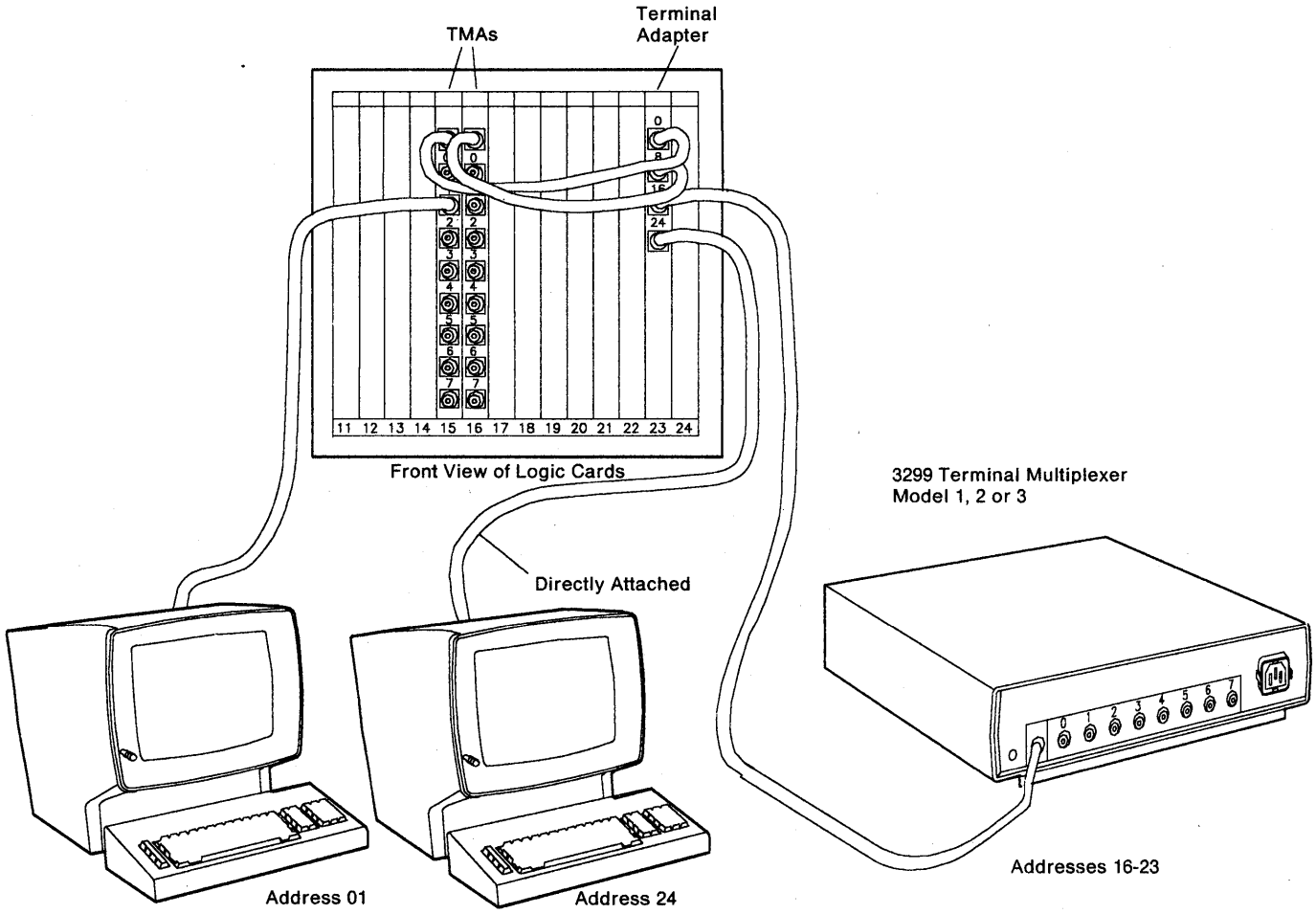


Figure 1-3. Example of 3174 Terminal Attachment

Asynchronous Emulation Adapter Device Attachments

The Asynchronous Emulation Adapter (AEA), with its input/output panel, provides eight 25-pin D-shell connectors for attachment to ASCII displays, printers, modems, or hosts. As many as three AEAs can be installed in the controller. Figure 1-4 shows some possible device attachments to the Asynchronous Emulation Adapter.

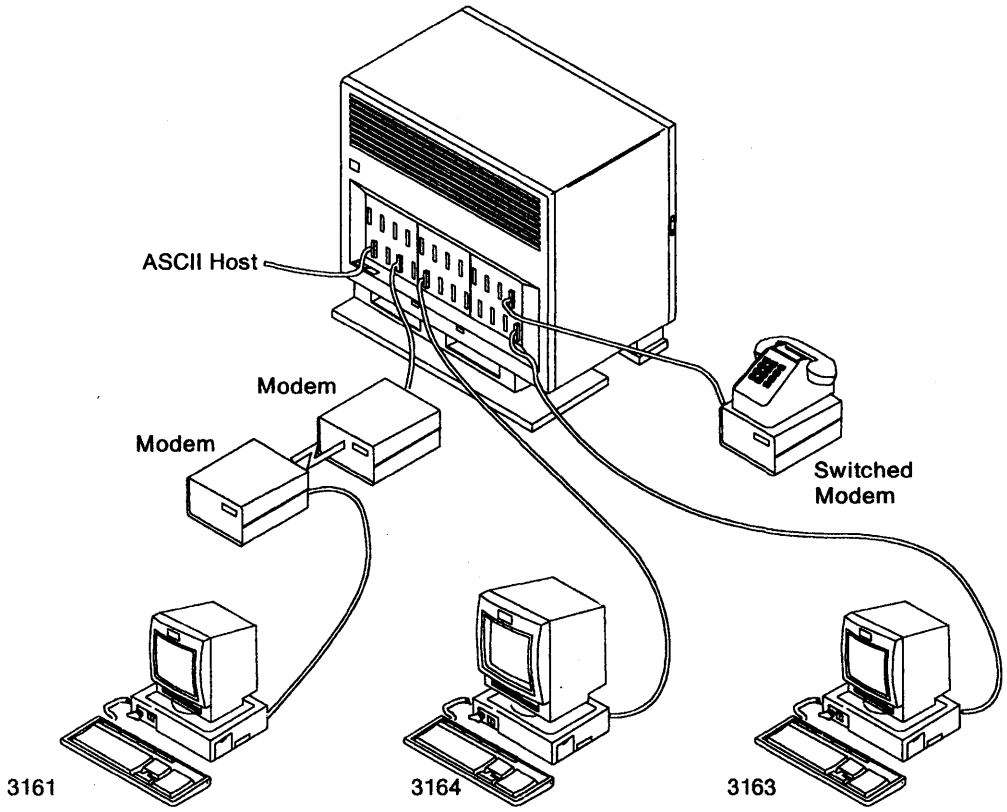


Figure 1-4. Asynchronous Emulation Adapter Device Attachments

Data Flow

3174 Data Flow

Figure 1-5 on page 1-11 shows the internal data flow in the 3174 Establishment Controller. This figure shows the hardware configuration for all models of the controller. There are four main buses in the controller:

- The FRU ID bus connects to all cards, diskette and fixed disk drives, and the operator panel.
- The MMIO bus connects to the channel adapter, the Token-Ring adapter, Asynchronous Emulation Adapter, and the Concurrent Communication Adapters.
- The PIO bus connects to the File/Terminal adapter, the Communication adapter, the Encrypt/Decrypt adapter, and the Operator Panel adapter card.
- The Storage bus connects to the storage cards.

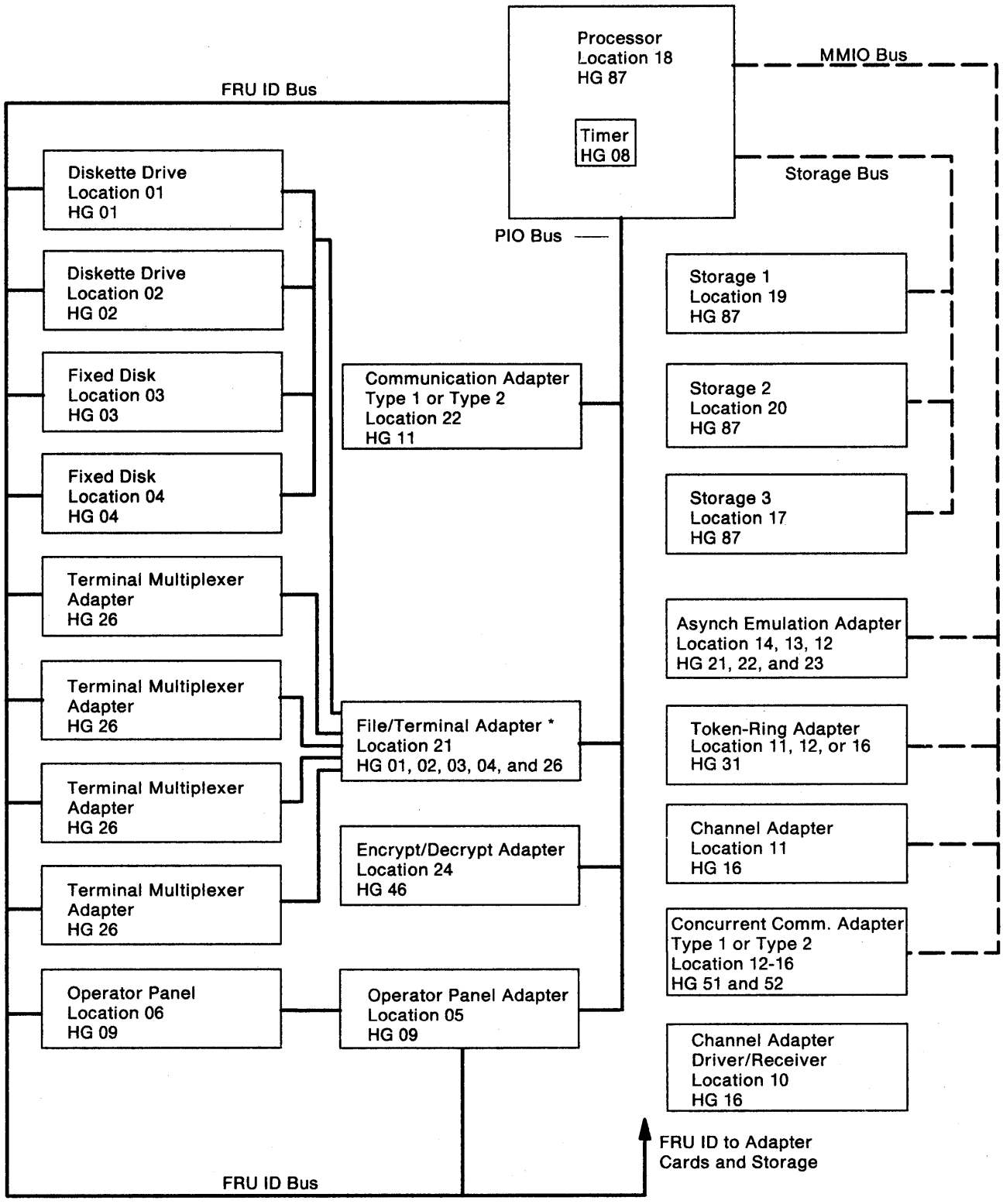


Figure 1-5. 3174 Internal Data Flow

* In some controllers the file adapter and terminal adapter are two separate cards. The file adapter would be installed in location 21, and the terminal adapter would be installed in location 22 or 23.

Figure 1-6 shows the external data flow for the Channel adapter, the Communication adapter, the Terminal adapter, the Token-Ring adapter, and the Asynchronous Emulation Adapter. This figure shows the maximum configuration of the 3174 Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R.

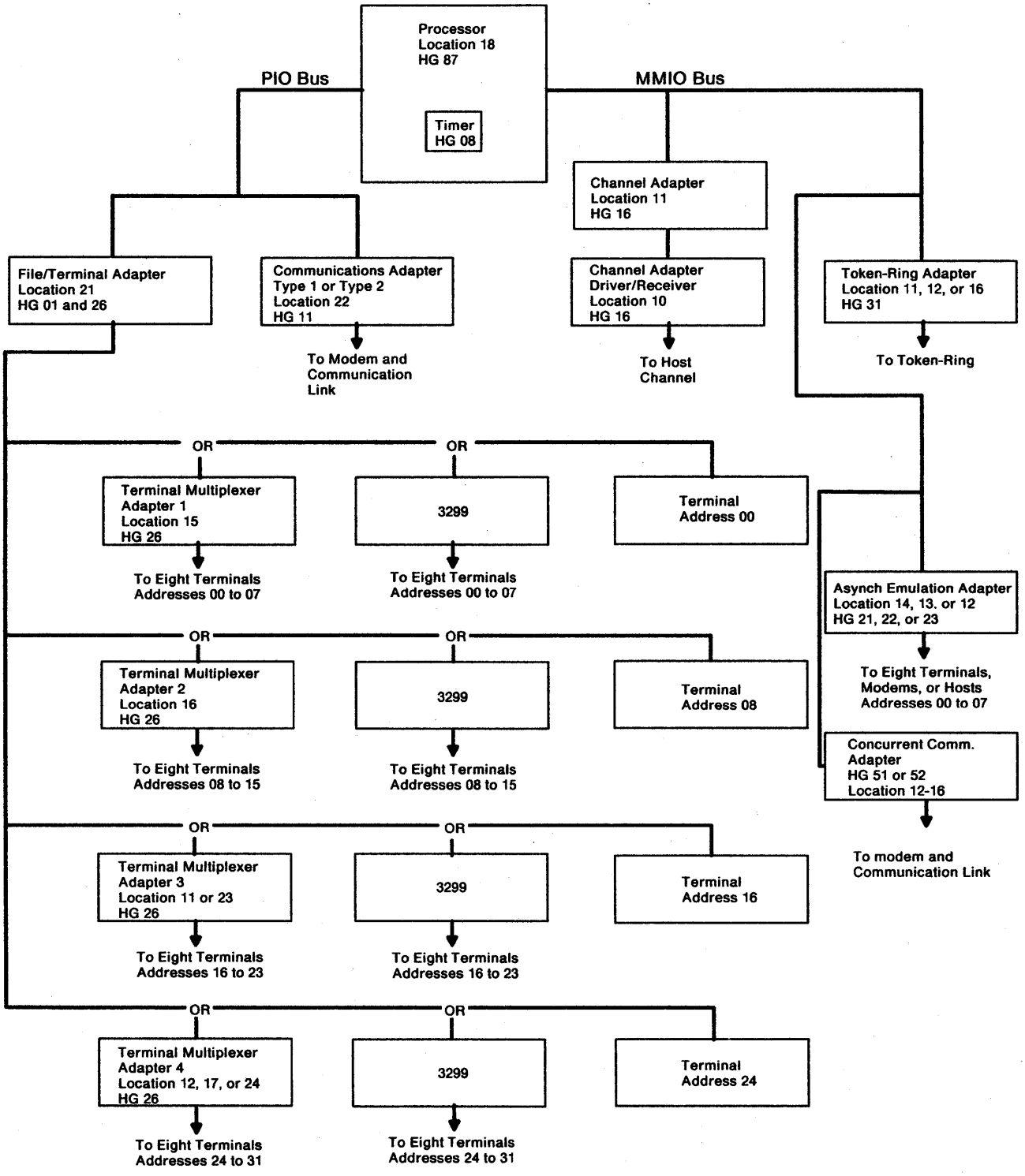


Figure 1-6. 3174 External Data Flow

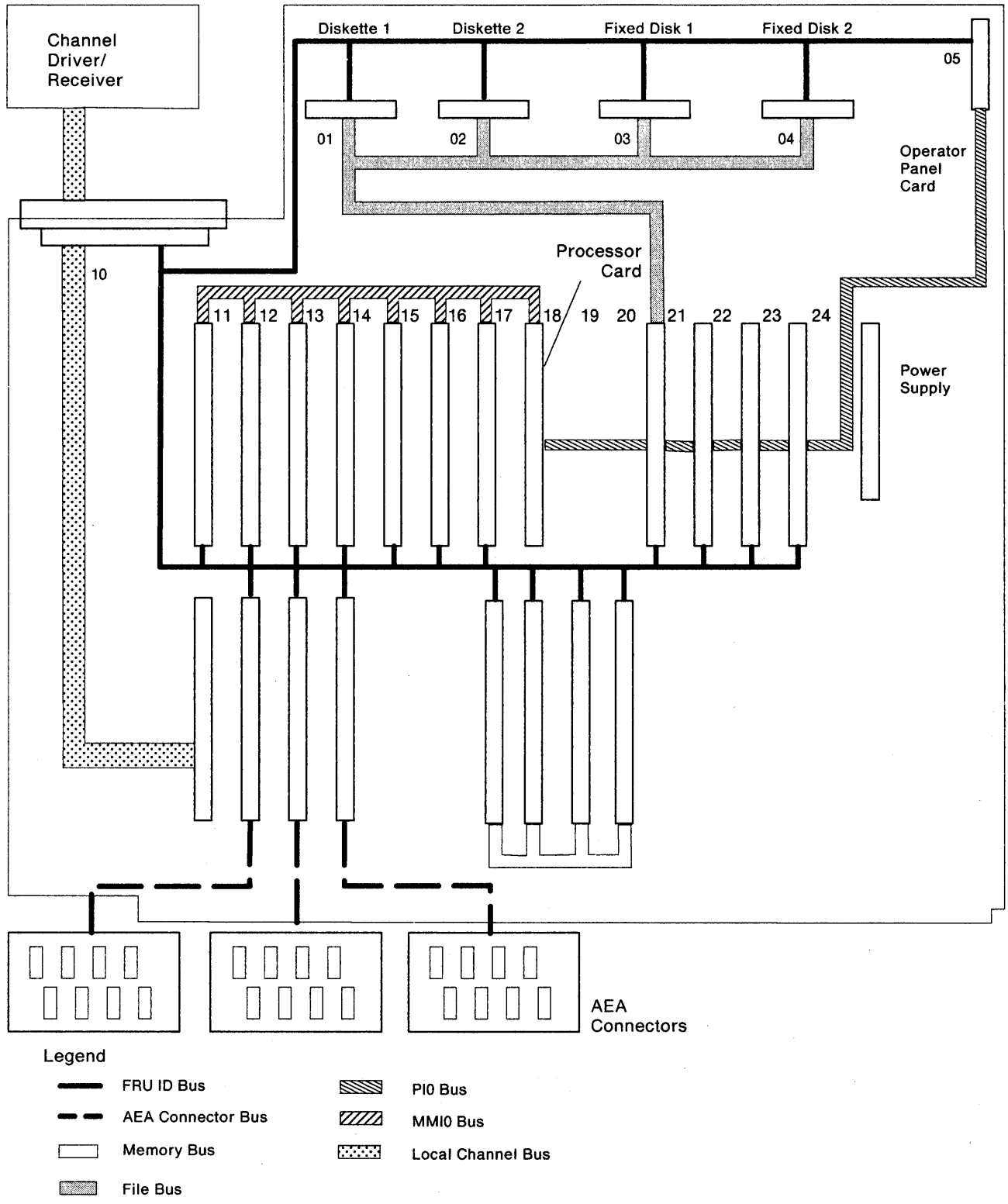


Figure 1-7. Bus to Card Connections

3174 FRU Descriptions and Functions

The following paragraphs describe the functions of the diskette drives, fixed disk drives, the operator panel, the adapter cards, the processor card, and the storage cards.

Diskette Drives HG 01 or 02

The 5.25-inch diskette drive uses a double-sided, high-density, 5.25-inch, removable diskette (77 tracks per side). The diskette drive motor is +12 Vdc, direct drive (nonbelt). The +12 Vdc motor is hardware-controlled and is turned on only when drive access is required. The diskette drive is packaged in a manner that allows it to be easily disconnected from the logic board. The drive interfaces with the file adapter, through a common bus, and with the FRU ID bus. The Models 1L, 1R, 2R, and 3R have a 1.2MB diskette drive. The Models 11L, 11R, 12R, and 13R have a 2.4MB diskette drive which is capable of reading or writing on a 1.2MB diskette.

Fixed Disk Drives HG 03 and HG 04

The fixed disk provides formatted storage capacity of 20 megabytes. The fixed disk contains the basic electrical and mechanical components necessary to read and write data. The additional logic required to use the fixed disk is present whether the fixed disk is installed or not. The Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Establishment Controllers can have up to two fixed disks. The fixed disk is a field replaceable unit (FRU). The fixed disks are located behind the operator panel and are plugged in and secured with a single thumbscrew.

Operator Panel HG 09

The operator panel contains the switches, indicators, and keypad (shown in Figure 1-13 on page 1-30). The operator panel plugs into the operator panel adapter card, which provides the interface to the logic board. The control logic for reading the keypad switches and for writing data to the status indicators is contained on the operator panel adapter card. The processor card reads and writes to the operator panel through the PIO bus. The processor card also interfaces with the operator panel and the operator panel adapter card through the FRU ID bus.

Type 1 Communication Adapter HG 11

The Type 1 Communication Adapter provides CCITT (International Telegraph and Telephone Consultative Committee) V.24/V.28 (EIA 232D) and CCITT V.35 electrical interfaces to connect the controller to a modem or other signal converter. A 25-pin D-shell connector is provided on the top of the card to allow connection of the communication interface cable. The adapter interfaces with the PIO bus and the FRU ID bus. The adapter logic works in PIO mode when BSC protocols are used and in CHIO mode for other protocols. The desired interface, V.24/V.28 or V.35, and the operational speed are selected under microcode control. External clocking is required. The adapter logic has a FRU ID capability to sense that the correct interface cable or wrap plug is attached.

Type 2 Communication Adapter HG 11

The Type 2 Communication Adapter provides a CCITT V.11 (X.21) electrical interface to connect the controller to an X.21 network or other signal converter that provides a compatible interface. A 25-pin D-shell connector is provided on the top of the card to connect the communication interface cable. The adapter interfaces with the PIO bus and the FRU ID bus. The adapter logic works in CHIO mode supporting SNA/SDLC protocols. The operational speed is selected under microcode control. External clocking is required. The adapter logic has a FRU ID capability to sense that the correct interface cable or wrap plug is attached.

Channel Adapter (Models 1L and 11L) HG 16

The channel adapter provides S/370 type channel host communication. It interfaces with the processor through the MMIO bus, FRU ID bus, and interfaces with the channel interface driver/receiver card. Attachment to selector, byte multiplexer, and block multiplexer channels is supported. SNA and non-SNA operational mode is selectable through customizing. When in SNA mode, the 3174 operates as a single-address controller. When in non-SNA mode, the 3174 operates as a shared multiple-address controller, using one of two address ranges: one address range for 16 terminals, and one address range for 32 terminals. The channel address is selectable through customizing in both SNA and non-SNA modes. The mode of data transfer to and from the channel is either data-chained interlocked (DCI) or high-speed transfer (HST). The data transfer mode is also selectable through customizing.

Channel Interface Driver/Receiver Card (Models 1L and 11L) HG 16

The channel driver/receiver card is used in conjunction with the channel adapter. It provides driver/receiver conversion for the S/370 type bus and tag lines between the host channel and the channel adapter. The driver/receiver card also contains solid-state select out bypass relays. The channel bypass switches located next to the driver/receiver card are used to set the channel priority of the controller (high or low) or to place the 3174 channel interface in a bypass condition to allow removal of the driver/receiver card without impacting the host channel.

Asynchronous Emulation Adapter HG 21, 22, and 23

The Asynchronous Emulation Adapter provides eight start/stop ports. It interfaces with the MMIO bus and the FRU ID bus. The adapter contains a microprocessor and storage. A short cable between the controller logic board and an I/O panel containing eight 25-pin D-shell connectors carries signals to and from the adapter. The adapter allows ASCII devices to communicate with ASCII hosts, and performs protocol conversion to allow certain ASCII devices to communicate with IBM hosts, and certain 3270-type devices to communicate with ASCII hosts. The communication interface is a standard EIA 232D connector. The adapter logic has a FRU ID capability to sense that the I/O panel is connected to its adapter.

File/Terminal Adapter HG 01 and HG 26

The File/Terminal adapter is a dual-function card. It provides buffering and control for attachment of a maximum of 32 displays, printers, or workstations and provides read/write control for the diskette drives and fixed disk drives that can be installed in the controller. The file/terminal adapter interfaces with the PIO bus, the FRU ID bus, and the diskette drive(s). Each of the four dual-purpose connectors (DPCs) on the adapter card provides a path to either one terminal, or to one 3299 Terminal Multiplexer, or to one Terminal Multiplexer Adapter (TMA). Signals from each port contain addressing for a maximum of eight terminals. The distance terminals or 3299s are located from the controller depends on the cable media being used and whether the particular terminal or 3299 requires a balun. See Table A-1 on page A-3. A diagnostic wrap capability, under microcode control, is provided at the driver/receiver output of the terminal adapter. Logic for driver/receiver wrapping, timeout delay selection, and addressed cable protocol are also included on the terminal adapter.

Terminal Multiplexer Adapter HG 26

The Terminal Multiplexer Adapter (TMA) performs the same functions as an external 3299 Model 2 Terminal Multiplexer. Input to the TMA is through a short length of RG-62A/U coaxial cable between a terminal adapter port and the top dual-purpose connector (DPC) on the TMA. The output signals from the terminal adapter contain addressing to select one of eight possible DPC output driver/receiver ports. The distance terminals are located from the controller is the same as described for the terminal adapter. A diagnostic wrap capability, under microcode control, is provided at the driver/receiver output of the TMA card. The TMA cards interface with the FRU ID bus.

Token-Ring Adapter HG 31

Two Token-Ring adapters are available. One supports baseband communications at 4 megabits per second (Mbps); the other 16, or 4Mbps. The Token-Ring adapter provides an IEEE (ECMA 89) standard interface to an IBM Token-Ring Network. The adapter interfaces to the MMIO bus and the FRU ID bus. The adapter contains a microprocessor, storage, read-only storage (ROS), and other logic to provide the physical interface, link clocking, serialization/deserialization, link address recognition, frame structuring/stripping, and error checking. A nine-pin connector is provided to attach the Token-Ring interface cable to the adapter.

Encrypt/Decrypt Adapter HG 46 (Models 1R, 2R and 3R Only)

The Encrypt/Decrypt adapter provides the logic to encode and decode data traffic between SNA nodes according to the United States National Bureau of Standards Data Encryption (DES) algorithm. Encryption is not available to distributed function terminals operating in DFT mode. The adapter card contains a 4.14 V mercury battery, an oscillator, control logic, storage for the encrypt/decrypt master key, and a security keylock to prevent unauthorized access to the adapter. It interfaces with the PIO bus and the FRU ID bus.

Type 1 Concurrent Communication Adapter HG 51 and HG 52

The Concurrent Communication Adapter card interfaces with the MMIO bus and the FRU ID bus. It provides a secondary communication link between the 3174 and hosts other than the primary communication link (channel or communication adapter). The Type 1 Concurrent Communication Adapter provides CCITT (International Telegraph and Telephone Consultative Committee) V.24/V.28 (EIA 232D) and CCITT V.35 electrical interfaces to connect the controller to a modem or other signal converter. A 25-pin D-shell connector is provided on the top of the card to allow connection of the communication interface cable. The adapter logic works in PIO mode when BSC protocols are used and in CHIO mode for other protocols. The desired interface, V.24/V.28 or V.35, and the operational speed are selected under microcode control. External clocking is required. The adapter logic has a FRU ID capability to sense that the correct interface cable or wrap plug is attached.

Type 2 Concurrent Communication Adapter HG 51 and HG 52

The Type 2 Concurrent Communication Adapter card interfaces with the MMIO bus and the FRU ID bus. It provides a secondary communication link between the 3174 and hosts other than the primary communication link (channel or communication adapter). The Type 2 Concurrent Communication Adapter provides a CCITT V.11 (X.21) electrical interface to connect the controller to an X.21 network or other signal converter that provides a compatible interface. A 25-pin D-shell connector is provided on the top of the card to connect the communication interface cable. The adapter logic works in CHIO mode supporting SNA/SDLC protocols. The operational speed is selected under microcode control. External clocking is required. The adapter logic has a FRU ID capability to sense that the correct interface cable or wrap plug is attached.

Processor Card HG 87

The processor card contains the controller microprocessor, a timer, ROS module, and other timing and control logic. It also contains logic for single-bit per halfword storage error correction and double-bit storage error detection. The processor card interfaces with the PIO, MMIO, storage, and FRU ID buses. A red light-emitting diode (LED) on the card blinks during processor testing. During the ROS portion of the processor tests, the conditions of this LED are used to help isolate PIO bus and ROS problems.

Storage Card (512KB) HG 87

The 512KB (1 KB equals 1024 bytes) storage card contains storage and switching logic that provides 524 288 bytes of usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The storage card interfaces with the storage bus and the FRU ID bus.

Storage Card (1MB) HG 87

The 1MB (1 MB equals 1 048 576 bytes) storage card contains storage and switching logic that provides 1 048 576 bytes of usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The 1MB storage card interfaces with the storage bus and the FRU ID bus.

Storage Card (2MB) HG 87

The 2MB card contains storage and switching logic that provides 2 097 152 bytes of usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The storage card interfaces with the storage bus and the FRU ID bus.

Hardware Group Numbers

Hardware group (HG) numbers are used during offline tests as part of a test invocation entry and are included with Alerts when errors are reported to the host. Hardware group numbers are also included in the controller event logs and ops panel status codes. Hardware group numbers (see Table 1-3) are assigned as follows:

- Hardware group numbers 01 through 52 are assigned to individual FRUs in the controller, such as adapter logic cards and diskette drives.
- Hardware group number 80 is assigned to the test monitor program.
- Hardware group number 87 is assigned to the processor and storage cards.
- Hardware group numbers 81 and 82 are assigned to *Test All* modes: 81 is *CSU* tests, which are run after the controller is set up by the customer; 82 is *Installed* tests, which can be run by the customer as part of problem determination.

Table 1-3. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	22	Asynchronous Emulation Adapter
01	Diskette Drive 1	26	Terminal Adapters
02	Diskette Drive 2	26	Terminal Multiplexer Adapters
03	Fixed Disk 1	31	Token-Ring Adapter
04	Fixed Disk 2	46	Encrypt/Decrypt Adapter
08	Timer	51	Concurrent Communication Adapter
09	Operator Panel	52	Concurrent Communication Adapter
11	Communication Adapter	80	Test Monitor
16	Channel Adapter	81	Test All CSU Mode
16	Channel Driver/Receiver	82	Test All Installed Mode
21	Asynchronous Emulation Adapter	87	Processor/Storage
23	Asynchronous Emulation Adapter	99	Unassigned Hardware Group

Type Numbers

Type numbers are assigned to each logic FRU as an identifier. The FRU type number is four digits, and 9 is always the first digit. See Table 1-4.

Table 1-4. Type Numbers

Type	HG	FRU
0000		Invalid or Unknown
9000		Empty Card Location
9001		Invalid Card/Cond
9010	09	Operator Panel Adapter (Models 1L through 3R)
9011	09	Operator Panel Adapter (Models 11L through 13R)
9030	46	Encrypt/Decrypt Adapter
9051	87	512KB Storage Card
9052	87	1MB Storage Card
9053	87	2MB Storage Card
9110	01/02	Diskette Drive 1.2MB
9114	01/02	Diskette Drive 2.4MB
9120	01	File Adapter *
9132	03/04	Fixed Disk Drive
915X	26	Terminal Adapter *
9154	01/26	File/Terminal Adapter *
917X	26	Terminal Multiplexer Adapter
9210	16	Channel Adapter
9230	16	Channel Driver/Receiver
9253	11	Type 1 Communication Adapter (EIA/V.35)
9263	51/52	Type 1 Concurrent Communication Adapter (EIA/V.35)
9267	51/52	Type 2 Concurrent Communication Adapter (X.21)
927x	11	Type 2 Communication Adapter (X.21)
933x	21/22/23	Asynchronous Emulation Adapter
9350	31	Token-Ring adapter (4Mbps)
9351	31	Token-Ring adapter (16/4Mbps)
950x	87	Processor Card
9520	09	Operator Panel (Models 1L and 11L)
9521	09	Operator Panel (Models 1R, 2R, 3R, 11R, 12R, and 13R)
9540	21/22/23	AEA Cable Assembly

* In some controllers, the file adapter and the terminal adapter are separate cards. The file adapter (type 9120) would be installed in location 21 and the terminal adapter would be installed in another location.

Field Replaceable Unit Identification (FRU ID)

A FRU ID module is contained on the operator panel, logic cards, and the diskette drives and fixed disk drives contained in the 3174 controller. During an IML, these FRUs send their FRU ID numbers to the processor card. The FRU ID numbers are used to build the hardware configuration table, which is written on the diskette. This occurs every time an IML is performed. The hardware configuration table is shown in Figure 1-8. The hardware configuration table can be displayed by use of online test 2 (see "Test 2: Configuration Menu" on page 2-175) or by use of the offline test monitor (see "How to Display the Test Monitor Functions (Terminal Control)" on page 2-161).

```
                _____ Hardware Configuration Table _____

HG TYPE LC DESCRIPTION          SC      HG TYPE LC DESCRIPTION          SC

00 9001 00 Invalid Card/Cond            21 9540 61 AEA Cable Assembly
01 9154 21 File Adpt                    22 9333 13 Asynch Emul Adpt
01 9110 01 Diskette 1 - 1.2MB           22 9540 62 AEA Cable Assembly
02 9110 02 Diskette 2 - 1.2MB           23 9333 12 Asynch Emul Adpt
03 9132 03 Fixed Disk 1 - 20MB  32XX    23 9540 63 AEA Cable Assembly
04 9132 04 Fixed Disk 2 - 20MB          26 9154 21 Terminal Adapter
08 9500 18 Timer                        26 9172 17 Term Mpx Adpt 00-07
09 9010 05 Ops Panel Adpt               26 9172 23 Term Mpx Adpt 08-15
09 9521 06 Ops Panel Assembly           87 9053 19 Storage 2MB
11 9253 22 Type 1 Com Adpt-XXX
21 9331 14 Asynch Emul Adpt

Select Test; press ENTER ====>_

PF: 3=Quit              12=Test Menu
```

Figure 1-8. Hardware Configuration Table Example

HG = Hardware group
TYPE = FRU Type number
LC = FRU location
SC = Status code indicating an error on normal IML

Note: This panel shows a configuration for a Model 1R. In your 3174, those FRUs that are physically installed are displayed in this table.

For the communication adapters, the xxx = one of the following:

WRP = EIA/V.35 wrap plug is connected
V.35 = V.35 cable is connected
EIA = EIA cable is connected
NC = Nothing is connected
X.21 = X.21 cable is connected
WRP = X.21 wrap plug is connected
INV = An undefined cable or wrap plug is connected.

Status Codes

All status codes are listed in the *3174 Status Codes* manual. Status codes indicate the following:

- Controller failures
- Attached-device failures
- Communication link failures
- Host channel failures

- Microcode failures
- Program failures
- Operational IML progress
- Diagnostic IML progress
- Diagnostic prompt messages
- Diagnostic progress
- Prompt messages for procedures such as Configure, Patch, and Dump
- Token-Ring failures
- Asynchronous Emulation Adapter failures.

Status codes are displayed in four formats:

- A base status code one to four digits long without extended data, such as 1001
- A base status code three to four digits long with extended data, such as 3001 0XHG TYPE LOCA TYPE LOCA
- A base status code three digits long with additional data, such as 391 01HG B1B2 B3B4
- A base status code four digits long with additional data, such as 3221 TYPE LOCA.

Where a particular status code appears depends on the state of the controller and on the kind of condition that causes a status code to be generated.

Operational Status Code Operator Panel Presentation

When the controller is operational, most status codes are displayed in the operator information area of the attached terminals. Some status codes also are displayed on the controller operator panel. In addition, some status codes that occur when the controller is operational are temporary failures that are recoverable by the controller. Temporary failures are not displayed anywhere, but they are written in the controller event log. If enough temporary failures occur to degrade the performance of the controller, the event log can be examined to determine what the failures are.

Operational status codes that are displayed on the operator panel are either a single status code or a maximum of 10 status codes.

Single Operational Status Code: A single operational status code is displayed on the 3174 operator panel constantly for one hour. After an hour, the panel goes blank. This status code is displayed again by pressing the Enter key on the operator panel. The extended data for single status codes is displayed in the same manner as multiple status codes by pressing the Advance key.

Multiple Operational Status Codes: Multiple operational status codes that are displayed on the 3174 operator panel are presented in the following manner.

If multiple status codes occur, they are displayed one at a time and automatically scroll. For example: status code 381 occurs, then 3020, then 331. At the panel, 381 is displayed, followed by 3020, then 331, and then the panel goes blank. 381 is displayed again, followed by 3020, and so on. After one hour, the panel goes blank. The codes are redisplayed by pressing the Enter key on the operator panel. To examine any one of these codes to see whether the code has extended data, perform the following at the operator panel.

The following codes are examples for this procedure:

```
381 0101 (QAHG) 9110 (B1B2) 0100 (B3B4)
3020 0101 (QAHG) 9110 (B1B2) 0100 (B3B4)
331 0211 (QAHG) 9253 (B1B2) 2200 (B3B4) 01 (B5)

QA = Two digit number that further defines status code
HG = Hardware Group
```

1. Press Enter.
2. When 381 is displayed, press Advance to halt scrolling.
3. Press Advance; 0101 is displayed.
4. Press Advance; 9110 is displayed.
5. Press Advance; 0100 is displayed.
6. Press Advance; four blanks are displayed.
7. Press Advance; four blanks are displayed.
8. Press Advance; 381 is displayed again.
9. Press Enter to resume automatic scrolling.

These steps can be repeated for each status code.

Offline Test Status Code Presentation

Offline test status codes are displayed at the operator panel if the tests are being controlled at the operator panel. If the offline tests are being controlled from the terminal connected to port 0, the status codes are displayed at the terminal.

Offline Test Status Code Presentation (Terminal): On the terminal, any status code that occurs is displayed with all the additional fields, such as 3001 0XHG TYPE LOCA TYPE LOCA. If multiple status codes occur, they are displayed on the terminal in the format shown in the test log. (See Figure 2-20 on page 2-160 for an example of the test log.)

Offline Test Single – Status Code Presentation (Operator Panel): On the operator panel, when a status code occurs, the base status code is displayed. The additional fields are displayed by pressing the Advance key on the operator panel. For example, to display the additional fields for status code 3001, perform the following at the operator panel.

The following status code is used as an example for this procedure:

```
3001 0126 (QAHG) 9172 (TYPE) 1500 (LOCA) 9150 (TYPE) 2300 (LOCA)
```

1. At 3001; press Advance.
2. 0126 is displayed; press Advance.
3. 9172 is displayed; press Advance.
4. 1500 is displayed; press Advance.
5. 9150 is displayed; press Advance.
6. 2300 is displayed; press Advance.
7. Four blanks are displayed; press Advance.
8. Four blanks are displayed; press Advance.
9. 3001 is displayed.

The steps can be repeated to redisplay the additional fields.

Note: The eight blanks are displayed to indicate the end of the additional fields for a single status code. If more than one status code had occurred during the offline test, four blanks would have appeared at the end of each status code and eight blanks at the end of all the status codes.

Offline Test Multiple-Status Code Presentation (Operator Panel): Multiple status codes that occur during offline tests are displayed and examined in the same manner as single status codes. About 100 status codes can be saved in the test log and displayed at the operator panel. To display the multiple status codes and their additional fields, perform the following at the operator panel.

The following codes are examples for this procedure:

```
3001 0111 (QAHG) 9253 (TYPE) 2200 (LOCA)
3001 0121 (QAHG) 9120 (TYPE) 2100 (LOCA)
```

1. 3001 is displayed on the operator panel.
2. Press Advance; 0111 is displayed.
3. Press Advance; 9253 is displayed.
4. Press Advance; 2200 is displayed.
5. Press Advance; four blanks are displayed.
6. Press Advance; 3001 is displayed.
7. Press Advance; 0121 is displayed.
8. Press Advance; 9120 is displayed.
9. Press Advance; 2100 is displayed.
10. Press Advance; four blanks are displayed.
11. Press Advance; four blanks are displayed.
12. Press Advance; the first 3001 status code is displayed.

Repeat these steps to redisplay each status code and the associated additional fields.

Note: The status codes are separated by four blanks. The end of the status codes that occurred is followed by eight blanks, and then the first status code is redisplayed by pressing Advance.

For multiple status codes that appear at the operator panel during offline tests, it is recommended that these errors be displayed at the terminal connected to port 0. See "How to Display the Test Monitor Functions (Terminal Control)" on page 2-161.

Status Code Assignments

The following paragraphs describe the various categories of status codes, how status codes are displayed, and how they are logged.

The status codes are assigned to the following categories.

0000 through 0150

This number range is used by ROS on the processor card to identify failures that occur during processor card instruction testing. These numbers appear only on the operator panel.

2xx

This number range is used to indicate permanent or temporary terminal-adapter-attached terminal failures. These numbers appear at the attached terminal(s) and are logged. Some temporary failures are only logged in the status code event log and are not displayed.

3xx

This number range is used to indicate permanent or temporary controller failures. These numbers appear on the controller operator panel and devices attached to the terminal adapter and/or the Asynchronous Emulation Adapter. Some temporary failures are logged in the status code event log and are not displayed.

4xx

This number range is used to indicate SNA protocol errors, data stream errors, and host software errors detected when the controller is operational. These numbers appear on terminal-adapter-attached terminal(s) and are logged.

5xx

This number range is used to indicate communication link conditions and communication hardware failures that are detected when the controller is operational. These numbers appear on the attached devices or on the operator panel, and are logged. Some temporary failures are only logged in the status code event log and are not displayed.

6xx and 7xx

This number range is used to indicate attached-device failures on distributed function terminals (DFTs), such as a 3290. These numbers appear on the attached device.

8xx

This number range is used to indicate Token-Ring problems, ring station failures, and ring statistics, as well as problems with the Asynchronous Emulation Adapter and devices attached to it. Unrecoverable errors are displayed on the operator panel and logged. Temporary errors and status codes that simply provide statistics are logged in the status code event log and are not displayed.

1000 through 1099

This number range is assigned to the microcode bootstrap load from the diskette or fixed disk and to the extended processor card tests. These numbers appear only on the operator panel.

13xx

This number range is used by the prelinked operational microcode to indicate hardware failures while loading the test control monitor microcode after completion of the extended processor card tests. Additional fields may follow the base status code. These numbers appear only on the operator panel.

2xxx

This number range is used when an offline test has resolved a failure to a FRU or FRUs. The FRU type and location are contained in the additional fields that follow the base status code. The 2XXX numbers also indicate that tests are in progress or have been completed successfully. These numbers appear on the operator panel. If the tests are being controlled from the terminal connected to port 0, the status codes are displayed on that terminal.

3xxx

This number range is used when an offline test cannot resolve a failure to a specific FRU. This number indicates what action should be taken to isolate the failure, such as go to a MAP or run another diagnostic. Additional fields may be presented with the base status code. These numbers appear on the operator panel. If the tests are being controlled from the terminal connected to port 0, the status codes are displayed on that terminal.

4xxx

This number range is used for test prompt messages and exception conditions, such as:

Prompts for test selection or parameter input
Prompts for manual actions, such as disconnecting a cable
Exception conditions, such as invalid input.

Additional fields may be presented with the base status code. These numbers appear on the operator panel. If the tests are being controlled from the terminal connected to port 0, the status codes are displayed on that terminal.

5xxx

This number range is used to indicate failures and IML progression during the link-edit portion of an IML. Progress numbers are displayed in 5-second intervals. These numbers appear on the operator panel.

7xxx

This number range is used to indicate prompts, progress, and errors when customizing procedures are being performed, such as Configure, Update, and Copy. Additional fields may be presented with the base status code. These numbers appear on the terminal connected to port 0, and terminal hardware failure status codes are presented at the terminal.

8888

This status code is displayed when the lamp test is being performed. If this code is displayed and a lamp test is not being performed, a hardware failure has occurred that the microcode cannot isolate to a particular FRU. MAP 0400 is provided to isolate the cause of the 8888 status code.

3174 Event Log

Note: If Concurrent Communication Adapter is installed on your machine, you should be aware that the event log will show data for the host connection that you are using at the time the log was requested.

The 3174 provides a nonvolatile event log which is recorded on the control diskette or fixed disk that was used to IML the controller. Most error or status conditions are logged while the 3174 is operational (online). Logging does not occur during offline procedures or tests. The log has a 15 000 byte capacity, which accommodates 300 to 1400 events. It wraps when it is full, overlaying the oldest errors. This log is reset only by use of online test 4, option 2. Writing of log records occurs immediately for critical faults or when a disk buffer sector of 512 bytes has been filled. Figure 1-9 on page 1-25 shows an example of a typical event log. Review this example and read the paragraphs following the example to see how the event log can be used to troubleshoot problems on the controller.

The event log records for microcode release A3.0/S2.0 or higher have additional information to better identify the hardware elements associated with the logged event. Along with the PHG_PN (previously HG PN), there is an associated CHG_PN, when applicable. PHG_PN represents the primary hardware group and port number (see below) associated with the logged event or failure. CHG_PN identifies the hardware group and port number (see below) to which the PHG_PN was connected at the time of the logged event or failure.

In either case, primary or connection, the HG will have no PN associated with it (left blank) if it is not an HG supporting device attachment. Likewise, if there is no associated CHG_PN at the time of the logged event, that field will also be blank in the event log record.

Also added to the event log panel are identifiers for the extended data bytes. They are labeled B1 – B15 to make it easier to correlate the data bytes to their descriptions in various other parts of this manual and in the *3174 Status Codes* manual.

```
                        _____ Log Records - All _____


(Day/Time since last POR: 000/08:11)
Day Time   SC    QA  PHG_PN  CHG_PN  LT  Extended data bytes (B1-B16)
                                         B1   B3   B5   B7   B9   B11  B13  B15
000 08:11  0315  58  16                  9210 1100 01
000 00:05  0384  05  99                  0387 0385
000 00:03  0500  01  16
000 00:02  0503  01  16
000 00:02  3174  01  00
015 21:48  0402  02  16      26_02   002 0000 0003 F350 0000
015 21:22  0401  03  16      26_02   006 0001 0004 3C40 4000
015 21:20  0209  51  26_08   16      008
015 21:19  0201  51  26_08   16      008
015 21:07  3174  01  00
0I5 20:01  0311  01  87              9052 1900

SC=Status Code    QA=Qualifier   HG=Hardware group       PN=Port number
PHG_PN=PrimaryHG_PN      CHG_PN=ConnectingHG_PN      LT=Logical terminal

To go directly to other tests, enter: /Test,Option
Select test; press ENTER====>_

PF: 3=Quit              8=Fwd          12=Test Menu
```

Figure 1-9. Sample Event Log (Example only)

In the example above, the Day/Time field since last power on reset (POR) field indicates 08 hours and 11 minutes have elapsed since the last POR IML. In many cases, it is useful to determine when the IML occurred with respect to the errors that have occurred. Status code 3174 is written to the log at the completion of every normal IML. In the example, a 3174 status code occurred at Day/Time 0000/00:02. This particular IML was a power-on IML because the Day/Time has been reset to zeros (an IML takes about 2 minutes to complete). At Day/Time 0015/21:07, another IML occurred. Note that the timer was not reset. This is not a power-on IML.

At time 00:02, a 503 01 (SC QA) occurred immediately after IML completion, indicating the channel adapter (HG 16) recognized that the Channel Interface switch was in the Offline position. At time 00:03, the problem was cleared by operator intervention and status code 500 01 was logged, indicating that status code 503 01 was deleted from the operator panel. Status code 500 is used to indicate that a condition for a particular hardware group has been cleared.

At time 00:05, status code 384 05 was logged, indicating a downstream load (DSL) diskette could not be found in the 3174 diskette drives. In the extended data for this code, 0387 is indicated for diskette drive 1. This means the wrong diskette is in the drive. 0385 in the extended data means diskette drive 2 is not ready.

At time 08:11, status code 315 58 occurred on the channel adapter (HG 16). This indicates a controller recoverable channel parity check occurred.

Note: Status code qualifiers (QA) above 50 indicate temporary conditions. 9210 in the extended data is the channel adapter type number, and 1100 indicates the adapter is in machine location 11. The 01 indicates the adapter is running on interrupt level 01.

In many cases it is necessary to determine the cause for a re-IML. This is usually the log record just before the 3174 IML status code. For example, if the 3174 at time 21:07 is an unplanned IML, the log record at time 20:01 may be the source of the problem. In the example, at time 20:01 status code 311 01 was logged for HG 87 (processor/storage). This indicates that an unrecoverable storage failure occurred. In the extended data, 9052 is the card type number and 19 indicates the location of the storage card that failed.

The event log is also useful to identify terminal failures. In the example, at time 21:19, status code 201 51 was logged. This code indicates that the coax threshold of 16 errors in a 30-minute period was exceeded for port 08. One minute later, at time 21:20, status code 209 51 was logged for the same port, indicating a recoverable terminal adapter command queue failure occurred. Both failures point toward possible coax noise problems. Both failures occurred while the device attached to port 08 was communicating (connected) to hardware group (CHG) 16.

The 3174 also attempts to pinpoint data stream errors by logging the condition and the details of the condition for use by the system programmer. In the example, at time 21:48, status code 402 02 occurred, indicating a data stream protocol problem was detected on the terminal attached to port 02. At the time of the event, port 02 was communicating (connected) to a device attached to hardware group 26, port 02 (CHG_PN). The status code and the qualifier indicate that the data stream contained an invalid (out-of-range) address. The extended data gives further details about the error. The first 2 extended data bytes are 0000 and indicate that the command received by the 3174 for the data stream in error was not a Write Structured Field (WSF). The second set of 2 bytes in the extended data indicate that the invalid address was found 3 bytes after the command in the data stream. The third set of 2 bytes shows the data found to be in error. F350 addresses buffer position 3280 for the attached terminal. The terminal should have Model 4 or Model 5 characteristics to support this address. A host SYSGEN or application program problem or a terminal setup problem should be suspected. A trace of the data stream is not necessary with the above information; but, if one were taken, it would look similar to the example shown in Figure 1-10.

```
Byte#  00  01  02  03  04
Data   7E  40  11  F3  50

7E = Command = Erase/Write Alternate
40 = Write Control Character = Reset
11 = Set Buffer Address (SBA) order
F350 = The invalid address
```

Figure 1-10. Data Stream Trace Example 1

At time 21:22, another data stream problem occurred. Status code 401 03 indicates that the terminal attached to port 02 of hardware group 26 received a data stream from the host that contained an invalid command. The extended data gives further details about the error. Since the first 2 bytes of the extended data are not zero, the data stream was started with a Write Structured Field (WSF) command. The value 0001 indicates that the error occurred in the first structured field in the data stream. The data in error was found to be at a displacement of four bytes (0 origin) into the structured field containing the error, and the data was 3C40. The structured field type was 40, indicating an outbound 3270 data stream structured field. Byte 4 of the outbound 3270 data stream structured field must contain a valid 3270 Write or Copy command code. 3C is not a valid command code. An application program problem should be suspected. Given this information, a trace of the failing data stream should not be necessary; but, if one were taken, it would look similar to the example shown in Figure 1-11.

```
Data Stream Byte#         00                  01   02     03 04 05 06
Structure Field Byte                          00   01     02 03 04 05
Data                      F3                  00   06     40 00 3C 40
F3   = Command = Write Structured Field
0006 = Length of the first structured field
40   = Outbound 3270 Data Stream Structured field
3C40 = Data in error (not a command)
```

Figure 1-11. Data Stream Trace Example 2

Operational status codes that are logged and also are displayed on the operator panel have a slightly different format at the operator panel. Example 1 shows how a status code appears on the operator panel. Example 2 shows how the same status code appears in the event log.

Example 1 Operator Panel

0211 9253 2200 0100

331 is displayed on the operator panel when the failure occurs.
Press Advance; 0211 is displayed.
Press Advance; 9253 is displayed.
Press Advance; 2200 is displayed.
Press Advance; 0100 is displayed.

331 = Status code.
0211 = Status code qualifier (QA) and a hardware group (HG) number
9253 = The FRU type number (TYPE)
22 = The location of the FRU (LOCA)
00 = Don't care
01 = The adapter interrupt level
00 = Don't care

Example 2 Event Log

The same status code as shown in Example 1 is shown in the following figure as it would appear in the event log.

```
                    _____ Log Records - All _____


 (Day/Time since last POR 115/13:07)
 Day Time   SC    QA  PHG_PN  CHG_PN    LT  Extended data bytes (B1-B16)
                                            B1   B3   B5   B7   B9   B11  B13  B15
 113 06:32  0331  02  11                    9253 2200 0100



 SC=Status Code    QA=Qualifier   HG=Hardware group       PN=Port number
 PHG_PN=PrimaryHG_PN      CHG_PN=ConnectingHG_PN      LT=Logical terminal

 To go directly to other tests, enter: /Test,Option
 Select test; press ENTER====>_

 PF: 3=Quit              8=Fwd          12=Test Menu
```

```
      SC = Status Code = 0331
      QA = Qualifier = 02
PHG_PN = Primary Hardware Group = 11 (no PN associated with PHG 11) Extended Data:
     9253 = TYPE
       22 = LOCA
       00 = Don't care
       01 = Adapter interrupt level
       00 = Don't care
```

Figure 1-12. Log Records Panel

Diskettes

Configuration Support A and S are written on 1.2MB diskettes. When using Configuration Support B, diskettes are written on 2.4MB diskettes. The 3174 Establishment Controller uses 5.25-inch diskettes with the following characteristics:

- 1.2MB capacity
- 2.4MB capacity
- Double-sided
- Soft-sectored.

Blank diskettes must be P/N 6109660 (1.2MB) or P/N72X6086 (2.4) or equivalent. The part numbers are for a box of ten.

The following 3174 diskettes are available:

- Utility diskette
- LFU (Limited Function Utility) diskette
- Control diskette
- DSL diskette (for support of downstream terminals and the Asynchronous Emulation Adapter)
- RPQ diskette
- Encrypt/Decrypt diskette
- 3174 Dump diskette.

Utility Diskette

One Utility diskette is shipped with each machine. Models 1L and 11L controllers with the gateway feature receive two Utility diskettes. One Utility diskette is used if the controller is being configured as the gateway controller for the Token-Ring Network. The other Utility diskette is used if the customer wants to configure the controller as channel attached and only supporting terminal-adapter-attached devices. These diskettes contain the microcode that supports the following functions:

- CSCU
- Merge DSL
- Diagnostics
- Encrypt/Decrypt
- Merge RPQs
- Modify Keyboards
- Media Management
- Identify Customizing Keyboard
- Copy
- Microcode Upgrade
- Configure
- Define Printer Authorization Matrix (PAM)
- Patch.

Limited Function Utility Diskette

This diskette contains the microcode that supports the following functions:

- Diagnostics
- Patch
- Copy Files
- Encrypt/Decrypt Master Key
- Identify Customizing Keyboard.

Control Diskette

Two Control diskettes are shipped with each machine. Models 1L and 11L controllers with the gateway feature receive four Control diskettes. One set of diskettes is used if the controller is being configured as the gateway controller for the Token-Ring Network. The other set is used if the customer wants to configure the controller as only supporting terminal-adapter-attached devices. These diskettes contain the operational microcode and enough diagnostic microcode to test the processor card and storage.

DSL Diskette

This is an optional diskette. It contains the microcode that supports the attachment of terminals that require a downstream microcode load, such as a 3290. A DSL diskette would also contain the microcode that supports the Asynchronous Emulation Adapter. Multiple DSL diskettes are normally merged onto one DSL diskette. Two diskette drives are required in the controller to support this function.

RPQ Diskette

This is an optional diskette. It contains microcode to support special features as required by a particular customer. A maximum of 30 RPQs can be contained on one RPQ diskette. Normally, customers will merge the microcode for the RPQs they are using onto the Control diskette.

Encrypt/Decrypt Diskette

This is an optional diskette. It contains the microcode that supports the Encrypt/Decrypt feature, which encodes data sent to the host and decodes data received from the host.

3174 Dump Diskette

This diskette (P/N 26F0106) is available from an IBM Parts Distribution Center. It contains the microcode that supports dumping the controller and distributed function terminals.

Operator Panel

The operator panel contains indicators, a keypad, function pushbuttons, and switches used by the IBM service representative for problem determination. See Figure 1-13 for the locations of these items, and see the descriptions that follow.

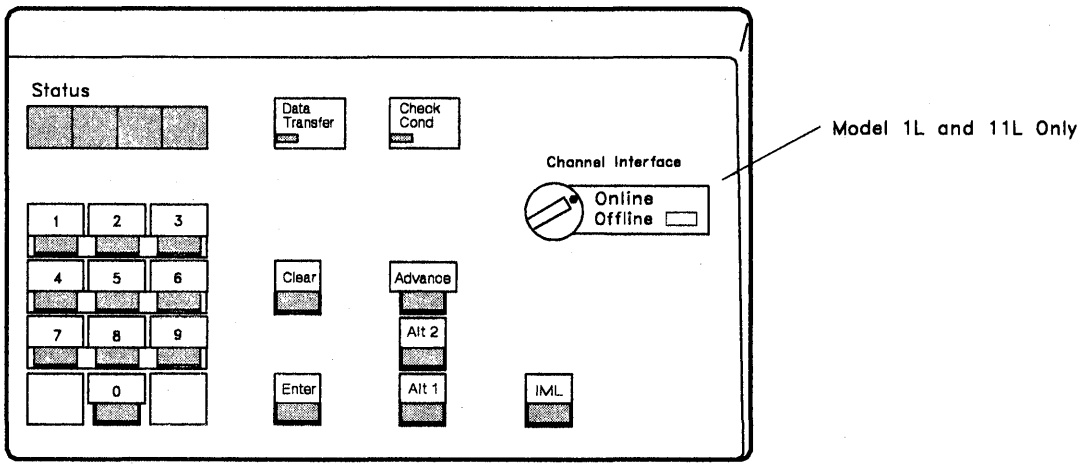


Figure 1-13. 3174 Operator Panel

Indicators

The 3174 has four Status indicators, a Data Transfer indicator, a Check Cond indicator and an Offline indicator.

Status Indicators: The four Status indicators display 0–9, e, h, l, p, dashes, and blanks. The displayed output can be 3174 status codes, test information, or keypad input.

Data Transfer Indicator: When on, this LED indicates the 3174 is sending or receiving host data.

Check Cond Indicator: When on, this LED indicates an unrecoverable controller hardware error, or a microcode failure, has occurred.

Offline Indicator (Models 1L and 11L only):: This indicator identifies when the controller is logically connected or disconnected from the host channel. When this indicator is on, it shows the controller is logically disconnected. When this indicator is off, the controller is logically connected.

Keypad

The keypad contains numeric keys 0–9. It is used to request functions or tests. Press the desired numeric keys, and the numbers are displayed from left to right in the Status indicators.

Function Pushbuttons

The operator panel contains the following function pushbuttons:

- Advance
- Enter
- Clear
- IML
- Alt 1
- Alt 2.

Advance Pushbutton: When you are entering or displaying more than four characters, after each group of four is displayed, pressing Advance allows any additional characters to be entered or displayed. When data is displayed, a display of four blanks indicates the end of a status code. When eight blanks are displayed, this indicates the end of a group of status codes. When you are entering data, after four digits are keyed in, pressing Advance stores the data, and the status indicators go blank. Additional digits can then be keyed in.

Enter Pushbutton: Pressing Enter indicates the function request or test request is complete and execution begins if the request is keyed in correctly. During online operation when the Status indicators are blank, pressing Enter will display a status code if one is pending.

Clear Pushbutton: Pressing Clear erases the data displayed in the Status indicators if the data was keyed in from the operator panel keypad.

IML Pushbutton: When pressed, IML performs an indicator test (8888 in the Status indicators). When it is released, all indicators go off, a reset occurs, and an IML starts from fixed disk 1 or 2 or diskette drive 1 or 2.

Alt 1 Pushbutton: When Alt 1 is pressed in conjunction with IML, the following functions can be selected:

- Customizing
- IML from an alternate IML device
- Tests.

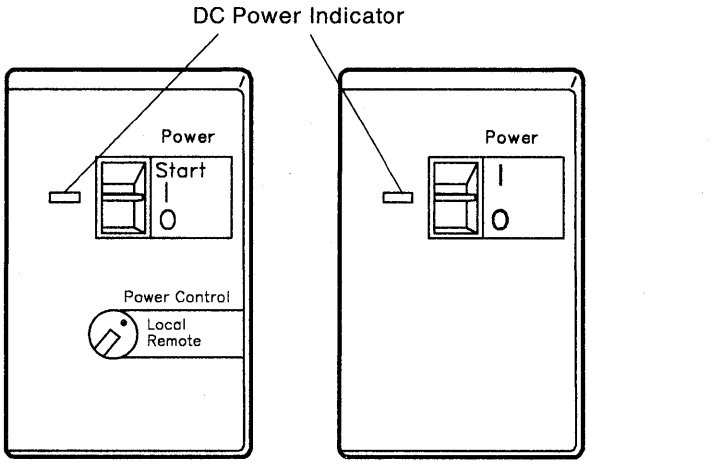
Alt 2 Pushbutton: When Alt 2 is pressed in conjunction with IML, tests run on the FRUs present in the controller, if the Utility diskette is installed in drive 01. Successful completion is indicated by status code 2082. If the Control diskette is installed in drive 1 the diagnostics only run on the processor and storage logic. Successful completion is indicated by status code 2587.

Channel Interface Switch: In the Offline position, this switch logically disconnects the 3174 from the host channel and the Offline indicator turns on.

In the Online position, this switch logically connects the 3174 to the host channel and the Offline indicator turns off. A normal IML should not be performed if the Channel Interface indicator is off.

AC Power Control

The AC power switch is mounted on the front of the 3174 power supply. Models 1L and 11L have a three-position AC power switch and a Local/Remote Power Control rotary switch. Models 1R, 2R, 3R, 11R, 12R, and 13R have a two-position AC power switch.



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

Figure 1-14. Power Control Panels

Models 1L and 11L Power Controls

These models can be turned on and off either at the controller (local) or from the host system (remote), depending on the position of the Power Control rotary switch. See Figure 1-14.

Local Power On: With the Power Control rotary switch in the Local position, move the power switch up to the Start position and then release it. The power switch returns to the on position. The green DC indicator comes on if the power supply voltages are within the proper limits.

Remote Power On: With the Power Control rotary switch in the Remote position, the 3174 will turn on and off from the host system if the power control sequence cable from the host is connected and the 3174 power switch is in the on (|) position.

Models 1R, 2R, 3R, 11R, 12R, and 13R Power Control

These models have a two-position AC power switch (see Figure 1-14). Move the power switch up to the on position. The green DC indicator comes on if the power supply voltages are within the proper limits.

Central Site Change Management

Central Site Change Management (CSCM) is a two-part process.

Part 1 allows the customer to create a central site library of microcode for each 3174 Establishment Controller in their network. This is accomplished by using the Central Site Customizing Utility. Once the library has been created, it is stored on Library diskettes or on a fixed disk.

Part 2 allows the customer to distribute his microcode from the central site. This is accomplished either by creating configured diskettes and mailing them or by using NetView™ Distribution Manager to electronically distribute the microcode to and from the controllers.

NetView is a trademark of the International Business Machines Corporation.

The following types of data can be distributed:

- Configuration data
- RPQ data
- Patch data
- DSL data
- Control and Utility microcode.

3174 IML Selections for CSCM

CSCM provides the ability to have more than one level of microcode or configuration data installed on a 3174 diskette/fixed disk at the same time. The microcode or configuration data can exist in three states:

- Production-level
- On-Trial level
- Back-level.

Note: Only two states of microcode or configuration data can exist at the same time. For example, a production-level and a back-level version of control microcode can exist at the same time. If a customer wanted an On-trial level of control microcode installed, they would have to remove the back-level or delete the production-level first.

Four manual IML selections are available to IML the different levels of microcode that can be installed:

Normal IML
Alt 1 using function selection 41
Alt 1 using function selection 42
Alt 1 using function selection 43.

Normal IML

A normal IML loads the production-level data objects from the first fixed disk or diskette drive that has control microcode installed that can be IMLed. The drive search order is fixed disk 1, fixed disk 2, diskette drive 1, then diskette drive 2.

Alt 1 selection 41

This IML loads the production-level data objects from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure.

Alt 1 selection 42

This IML loads the back-level data objects from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure. If a back-level version does not exist, the production version will be loaded.

Alt 1 selection 43

This IML loads on-trial-level data objects from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure. If a trial level does not exist, the production-level will be loaded.

For further information about CSCM see the *3174 Central Site Customizing User's Guide*.

IBM Token-Ring Network Gateway Feature

The IBM Token-Ring Network 3270 Gateway feature, a feature of the IBM 3174 Establishment Controller Models 1L, 1R, 2R, 11L, 11R, and 12R, provides for data passage between a Systems Network Architecture host processor and the devices on the IBM Token-Ring Network. See Figure 1-15 on page 1-35. Models 1L, 1R, 2R, 11L, 11R, and 12R with the gateway feature support 140 devices on the ring. The customer may, for performance reasons, elect to limit the number of devices that concurrently pass data to the host, through the gateway, to a number less than the maximum. The gateway feature does not interfere with the ability of ring-attached devices, such as IBM personal computers, to communicate with each other on the ring; neither does it affect non-ring terminals that are directly attached to the 3174 Establishment Controller.

For Models 1L and 11L, the addresses of devices attached to the Token-Ring Network are mapped to unique host subchannel addresses. One subchannel address is also required for the 3174 in which the 3270 gateway feature is installed. For Models 1R, 2R, 11R, and 12R, the addresses of devices attached to the Token-Ring Network are mapped to unique SDLC addresses.

The 3174 Token-Ring Network 3270 Gateway feature can be ordered with the 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R or it may be ordered as a feature and installed later by the customer.

The 3174 Token-Ring Network 3270 Gateway feature comprises:

- Token-Ring adapter
- Utility and Control diskettes
- Token-Ring communication cable.

Additional storage may be needed with this feature. The amount of storage required depends on how many devices are attached to the ring. For more details about storage requirements, see the *3174 Planning Guide*.

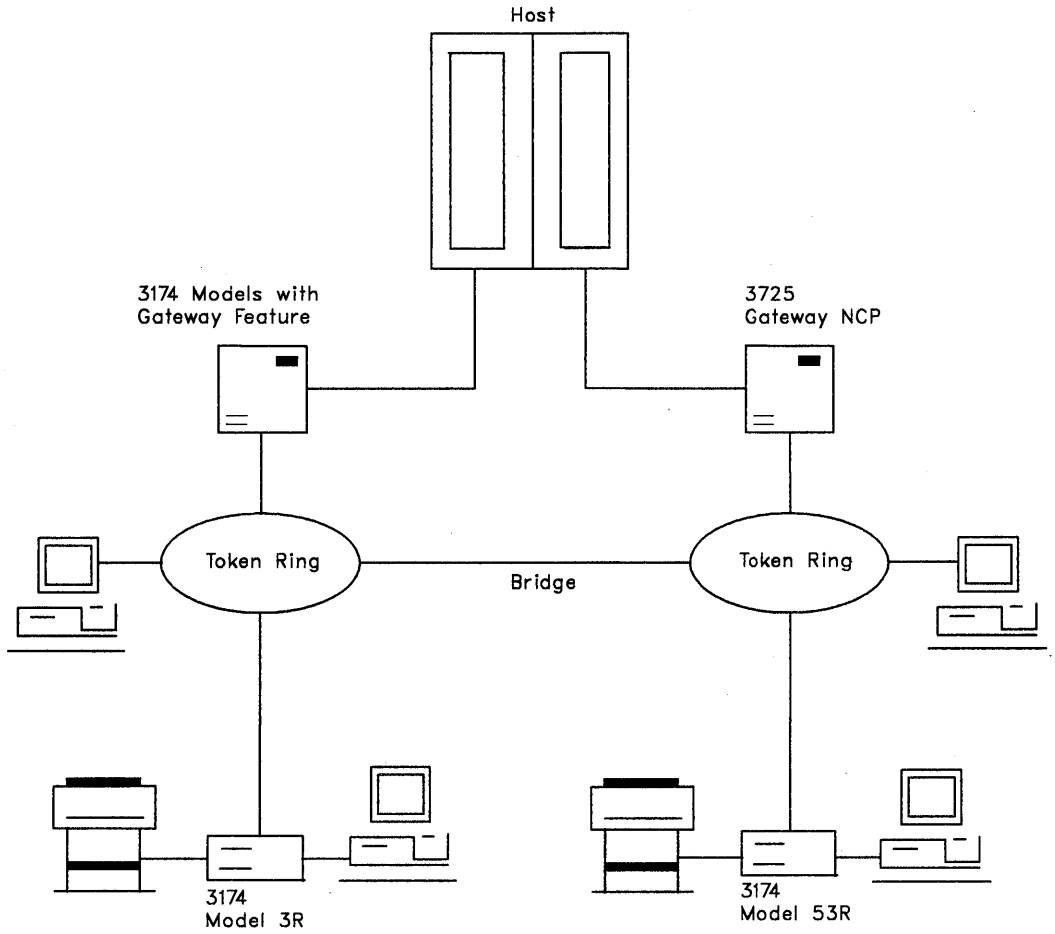


Figure 1-15. 3174 Token-Ring Network Connection

Token-Ring Gateway Feature Microcode

Utility and Control diskettes (configuration S) are provided with the Token-Ring Network 3270 Gateway feature. Configuration support for all 3174 functions applicable to the SNA Models 1L, 1R, 2R, 11L, 11R, and 12R is included.

The Utility diskette provides the ability to:

- Customize the 3174 as the Token-Ring gateway
- Assign a ring address for the controller containing the gateway feature
- Specify the addresses of work stations and controllers attached to the Token-Ring.

IBM Token-Ring Network Operation

The 3174 uses the Token-Ring adapter to interface to the ring to send and receive data. The 3174 tells the Token-Ring adapter that it wants to send a message to another device on the ring. The Token-Ring adapter places the message, the sender's address, and the receiver's address on a *token* circulating around the ring. That token then becomes a *frame*.

Each adapter on the ring checks the receiver's address on the frame to see if it should pass the frame to the next adapter on the ring or receive the frame. If an address match occurs, the adapter passes the frame to its attaching device, such as a personal computer, and indicates on the frame that it has been received. The frame then continues around the ring until it is received by the Token-Ring adapter that

originally sent it. The Token-Ring adapter checks the information on the frame to assure no errors exist and then releases a new token on the ring.

The IBM Token-Ring Network is a *baseband system* that permits only one token or frame on the ring at a time. Messages are transmitted and received at a rate of 4 or 16 megabits per second. All normal network operations are performed without user intervention once the message has been directed to the Token-Ring adapter. The operator of the 3174 does not have to be aware of routing and protocol procedures.

Token-Ring Adapter Addressing

Token-Ring adapter addresses are 12 digits (6 bytes) in length. Addresses may be in the range 00000001 – 799999999 (decimal). The customer's network administrator is responsible for preserving unique addresses for each adapter that is attaching to the Token-Ring Network.

There are two types of Token-Ring adapter addresses:

- Universally administered
- Locally administered.

Universally Administered Address: All Token-Ring adapter cards manufactured by IBM have universally administered addresses encoded on them.

The first 2 bits in byte 0 of the address are 00 for universally administered addresses. Every universally administered address is ensured unique by the Institute of Electrical and Electronic Engineers (IEEE). If the customer uses universally administered addresses, the 3174 must be reconfigured when a Token-Ring adapter is replaced. This applies to any device on the ring that requires replacement of its Token-Ring adapter card. The universally administered address for the Token-Ring adapter in the 3174 can be displayed by using the offline test for the Token-Ring adapter (HG 31) function number 10. See "How to Run Token-Ring Adapter Optional Tests" on page 2-155.

Locally Administered Address: Locally administered addresses are assigned by the customer during controller configuration. A locally administered address overrides the universally administered address encoded on the adapter card.

The first 2 bits in byte 0 of the address are 01 for locally administered addresses.

3174 Models 3R and 13R Attached to a Token-Ring Network

Models 3R and 13R provide for Token-Ring communication to an SNA host. Communication to the host is through a gateway that can be a through devices such as IBM 3725 Communication Controller with the Network Control Program Token-Ring Interface (NTRI) feature, 3174 Establishment Controller with the Token-Ring Network 3270 Gateway feature or other methods.

The 3174 Token-Ring adapter serves as the attachment to the IBM Token-Ring Network.

3174 Models 1R and 2R can be converted to a Model 3R. 3174 Models 11R and 12R can be converted to a Model 13R with a customer-installed model conversion package. No additional storage is needed to make this conversion.

Multi-Host Support

Multi-Host Support allows the 3174 to establish communication with multiple hosts through one or more physical connections. The host connections can be made through the Concurrent Communication Adapter (CCA) in the 3174 or through a gateway device on the ring attached to the Token-Ring Adapter (Single Link Multi-Host Support). Access to these multiple hosts is enabled by the use of the Multiple Logical Terminals (MLT) function and customizing. An operator can establish a total of five sessions, in various combinations, between the terminal and these multiple hosts.

Concurrent Communication Adapter

The 3174 control microcode will support two Concurrent Communication Adapters, with each adapter providing access to a host. There are two types of Concurrent Communication Adapter.

- The Type 1 Concurrent Communication Adapter provides CCITT (International Telegraph and Telephone Consultative Committee) V.24/V.28 (EIA 232D) and CCITT V.35 electrical interfaces to connect the controller to a modem or other signal converter.
- The Type 2 Concurrent Communication Adapter provides a CCITT V.11 (X.21) electrical interface to connect the 3174 to an X.21 network or other signal converter that provides a compatible interface.

Each type of adapter allows the terminal operator, through a keying sequence, to access its host in addition to the primary host. The operator switches sessions by using the Change Screen key sequence provided by the Multiple Logical Terminals function.

Single Link Multi-Host Support

Single Link Multi-Host Support allows the 3174 to establish communication with multiple hosts through one physical connection, a Token-Ring Network. Any Token-Ring gateway device connected to the Token-Ring Network can be accessed by the Single Link Multi-Host Support function. Up to eight hosts sessions can be configured for Single Link Multi-Host Support. The operator can also have multiple sessions on each of the hosts using the Multiple Logical Terminal function. Each port on the 3174 can be configured for a maximum of five sessions.

Asynchronous Emulation Adapter (AEA) Feature

The traditional 3270 subsystem environment consists of 3270 displays and printers communicating through the 3174 with a host system running a 3270 application program. See Figure 1-16.

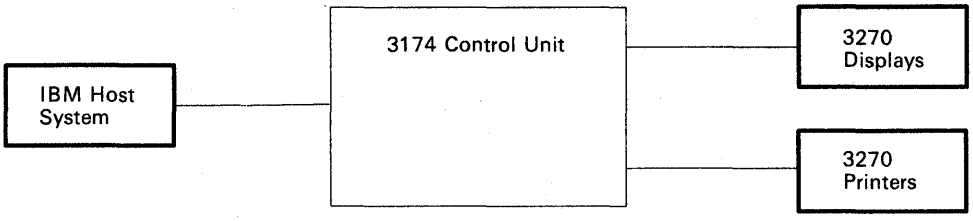


Figure 1-16. 3270 Communication

The AEA feature expands the connection and control capability of the 3174 to include communications with hosts, displays, and printers that use the American National Standard Code for Information Interchange (ASCII) communications protocol and hosts that use the International Organization for Standardization (ISO 646) National Language Support communications protocol. From now on in this publication, these hosts, displays, and printers will be referred to as ASCII hosts, displays, and printers. See Figure 1-17.

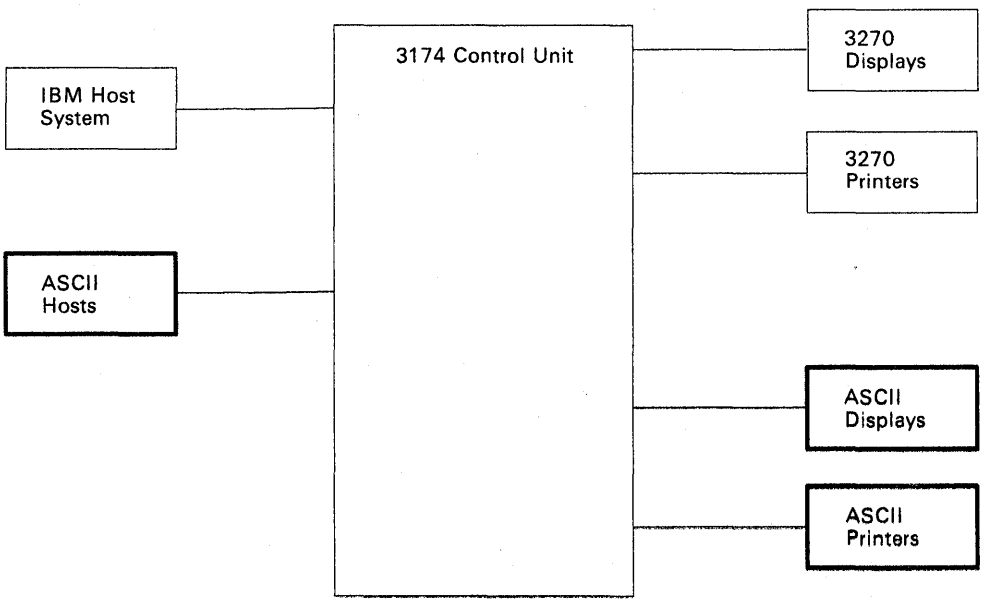


Figure 1-17. ASCII Communication

Asynchronous Emulation Adapter Communications

The AEA feature allows communication between:

- 3270 displays and/or printers to ASCII hosts (see Figure 1-18).
- ASCII displays and/or printers to IBM hosts (see Figure 1-19).
- ASCII displays and/or printers to ASCII hosts (see Figure 1-20 on page 1-40).

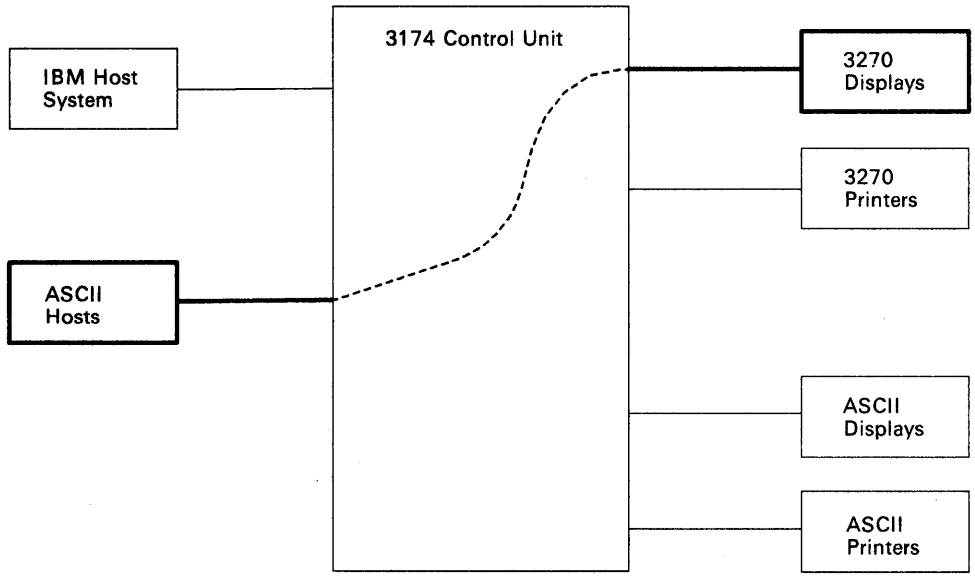


Figure 1-18. 3270 Terminal Communicating with an ASCII Host

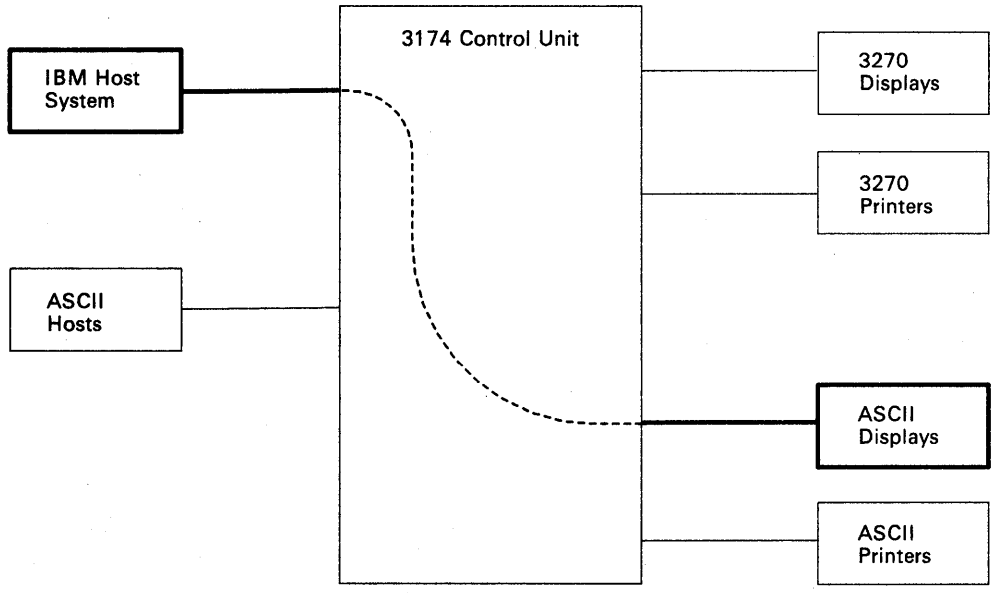


Figure 1-19. ASCII Terminal Communicating with an IBM Host

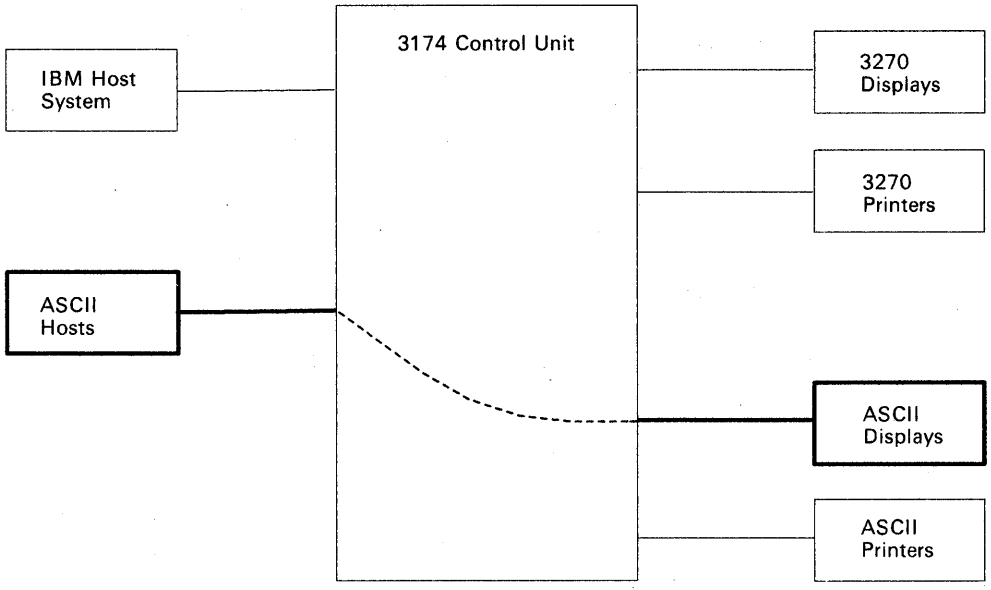


Figure 1-20. ASCII Terminal Communicating with an ASCII Host

Asynchronous Emulation Adapter (AEA) Hardware

Each Asynchronous Emulation Adapter and its associated cables and port connectors provide the capability to connect eight ASCII hosts, displays, or printers in any combination. Each adapter is identified by a hardware group (HG) number, and each port is identified by a port number.

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R support the installation of up to three AEA cards. When three adapters are installed, up to 24 ASCII hosts, displays and printers may be connected. See Figure 1-21.

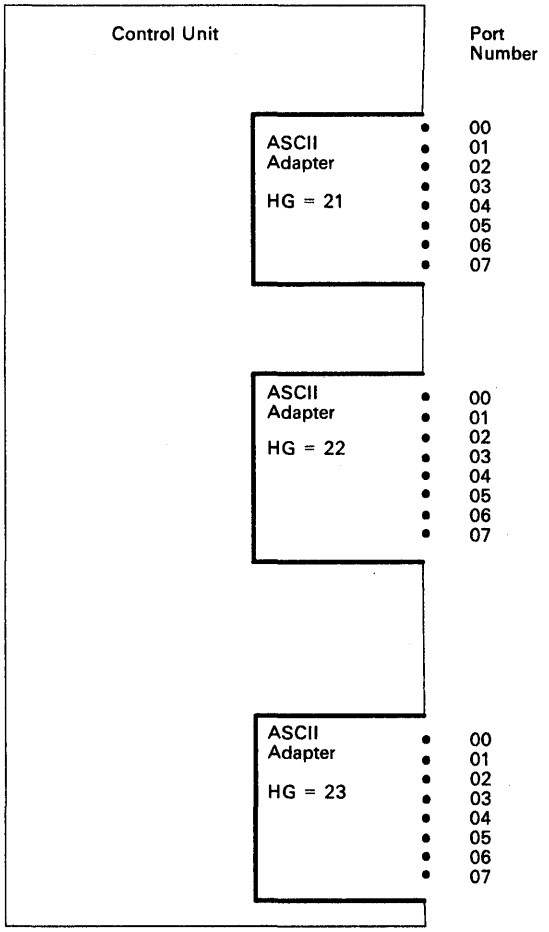


Figure 1-21. Asynchronous Emulation Adapter Hardware

In addition to the adapter card(s), the feature also includes an internal cable between each adapter card logic board location and an I/O panel. The I/O panel has eight 25-pin D-shell port connectors. The port connectors are numbered 0 through 7 and provide the method of connecting the communications link cables. See Figure 1-22 on page 1-42.

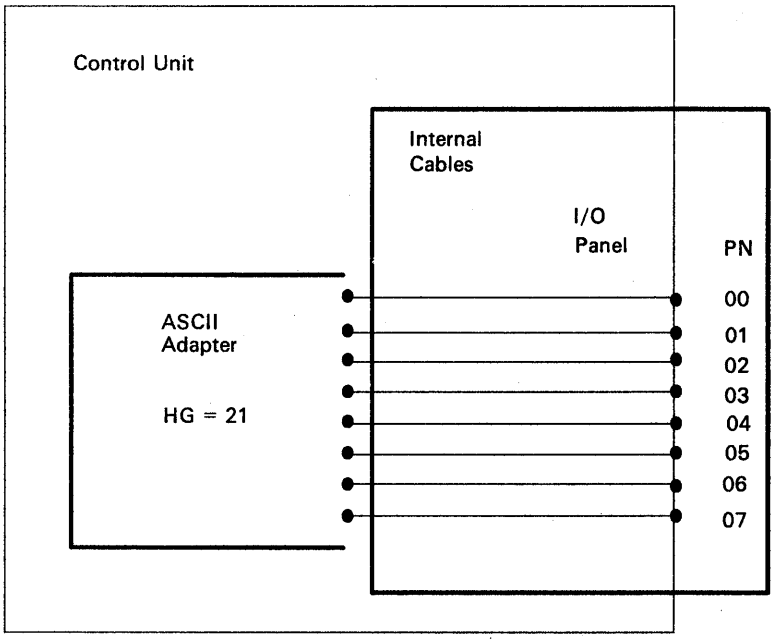


Figure 1-22. AEA I/O Panel

Communication Links and Associated Hardware

Three types of links are available:

- A direct cable from the AEA to the host, display, or printer
- A nonswitched link consisting of dedicated modems and customer-owned leased telephone lines
- A switched link consisting of programmable or intelligent modems (also called smart-modems) with access to the public dial telephone network.

See Figure 1-23.

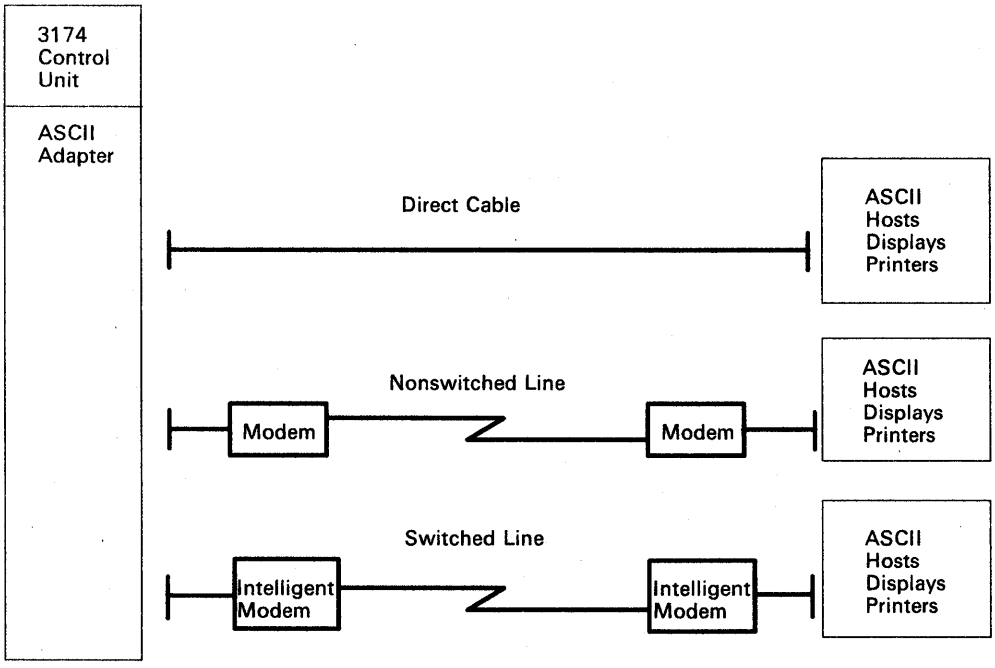


Figure 1-23. Communications Equipment

Physical and Logical Paths

The physical path between the controller and various hosts, displays, and printers is determined by the equipment installed as explained in the hardware section. Once this hardware is installed, the physical path will generally remain the same.

The logical path is determined by customizing. This is accomplished by either selecting a default host or presenting a Connection Menu from which the host is chosen by the display user. The ability to customize the Logical path makes it easier to change terminal user access to more than one host, particularly when adding new host access. See Figure 1-24.

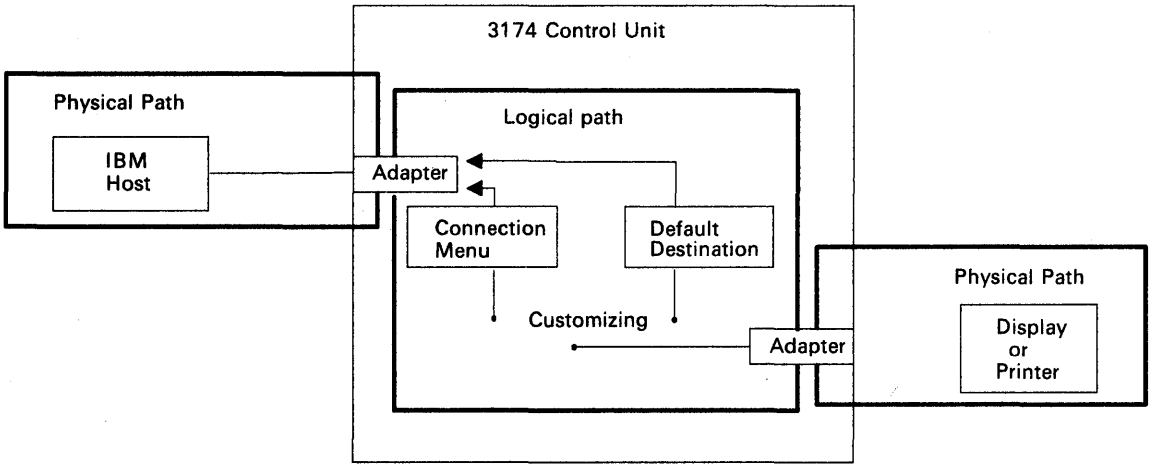


Figure 1-24. Physical and Logical Paths

Logical Path

Printers must be assigned to a host default destination. The host may either be the IBM host or an ASCII host. See Figure 1-25.

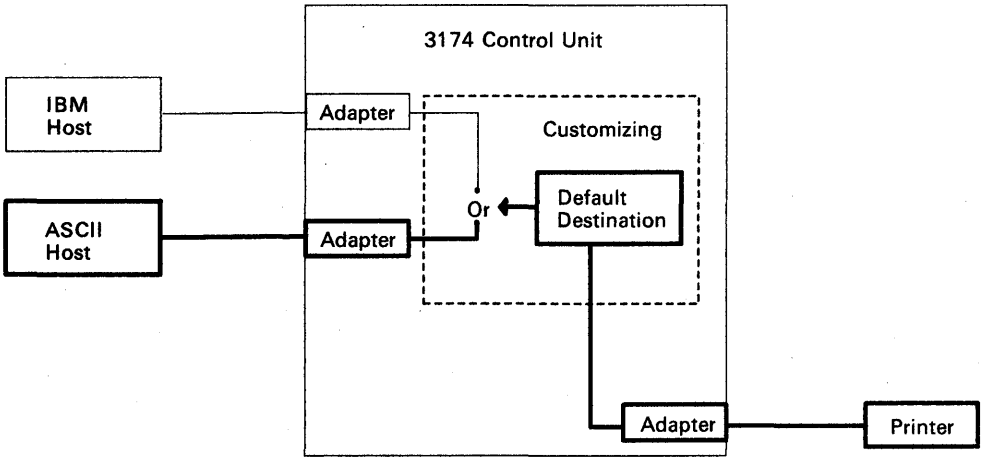


Figure 1-25. Printer Logical Path

Display users may be assigned the Connection Menu or a default host. If assigned to a default host, the path is the same as the one for printers. See Figure 1-26.

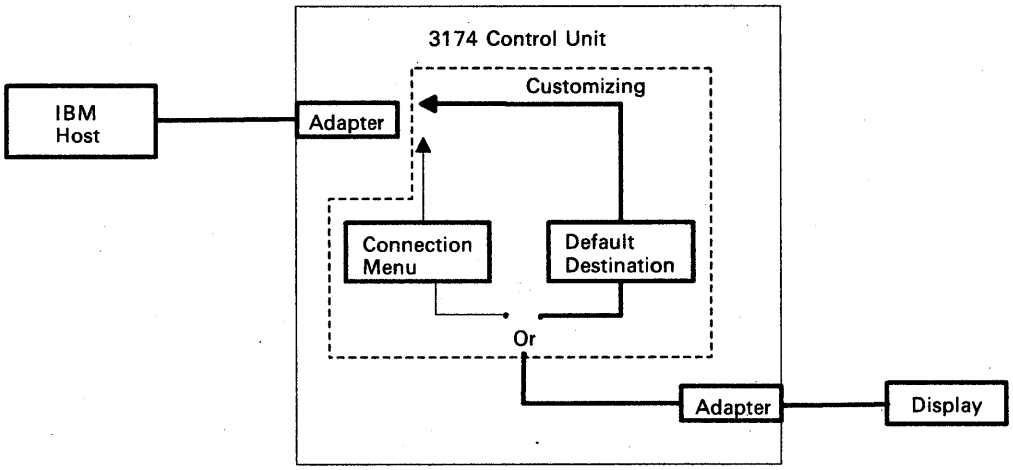


Figure 1-26. Display Logical Path

Connection Menu

The Connection Menu lists all the host connections that can be accessed by the display users. Hosts are identified at customizing time. See Figure 1-27.

```
                    _____ Connection Menu _____

Enter a number (NUM) or name on the Command Line, then press Enter

 NUM  NAME              STATUS       NUM   NAME              STATUS
 1    IBM HOST STATION               15
 2    ASCII HOST STATION             16
 3    ASCII HOST STATION             17
 4    ASCII HOST STATION             18
 5                                   19
 6                                   20
 7                                   21
 8                                   22
 9                                   23
 10                                  24
 11                                  25
 12                                  26
 13                                  27
 14                                  28

 PF1=HELP   3=END
 PF7=BACK   8=FWD

 ====> TO:_
```

Figure 1-27. Connection Menu

During customizing, there are two options available when presenting the Connection Menu for selection.

1. The terminal user is presented the Connection Menu but is only allowed to select the default host assigned. See Figure 1-28.

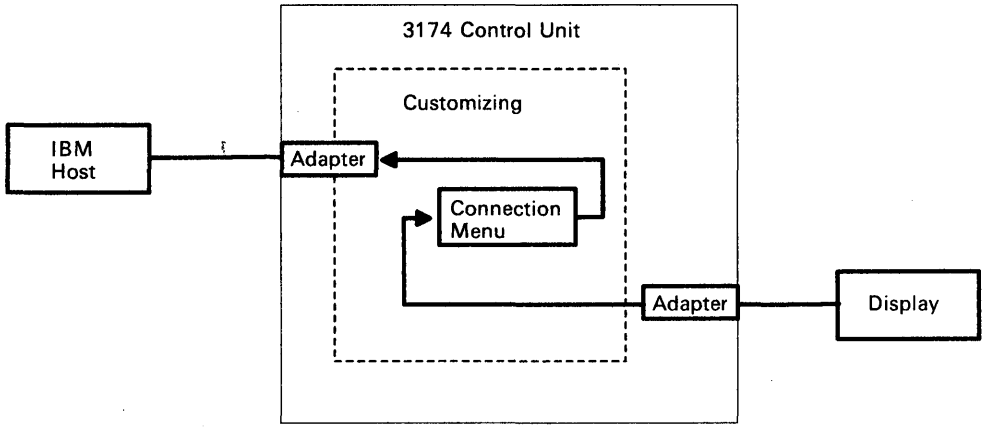


Figure 1-28. Connection Menu Option 1

2. The terminal user may be presented the Connection Menu and be allowed to select any one of the hosts from the list.

See Figure 1-29.

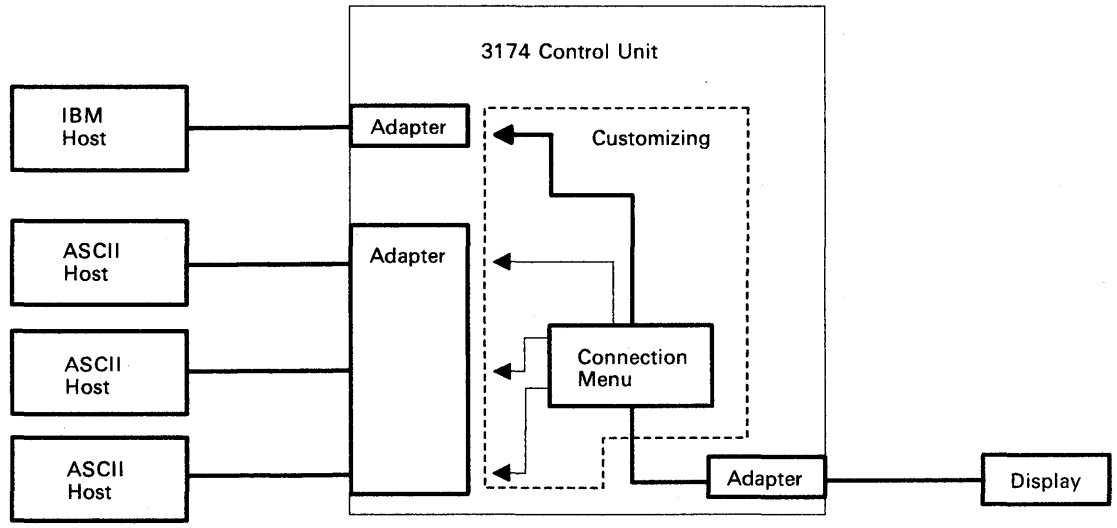


Figure 1-29. Connection Menu Option 2

Customizing the Asynchronous Emulation Adapter

In customizing the AEA feature, you will be asked to define the physical equipment path, connection type, and the operational characteristics of the equipment installed. You will also define the logical path as described previously. Once you have identified the physical and logical paths, you will be asked to summarize the information into sets for entry on the AEA customizing panels.

Stations and Sets

The term "station" is used in the customizing procedures to differentiate between the traditional 3270 operation and the additional access provided by the AEA feature. A station may be an IBM or ASCII host, an IBM or ASCII display, or an IBM or ASCII printer.

Many of the stations will have the same characteristics. Because of this commonality between stations, provisions have been made for inputting station information as a station set, thus eliminating the need to enter the same information multiple times. See Figure 1-30.

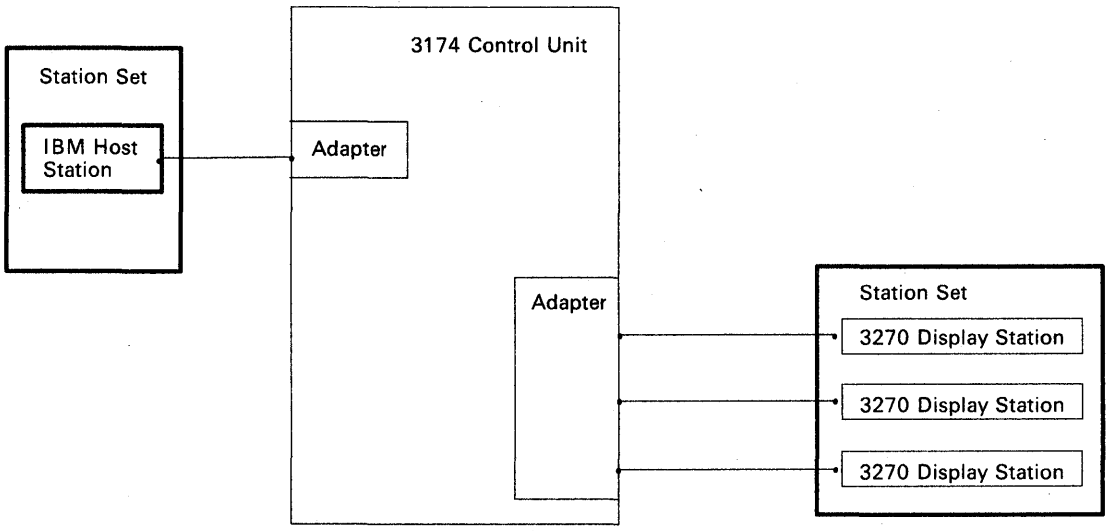


Figure 1-30. Host Set and Terminal Set

Port Type and Port Sets

The port type is used to identify the physical connection to the 3270 terminal adapter and ASCII adapter(s). The 3270 terminal adapter ports accept the traditional coaxial type cables used to connect 3270-type terminals. The AEA ports accept the cables used to connect direct, nonswitched, and switched communication links.

Many of the port types (coaxial, direct, nonswitched, switched) will be the same for a given station set. Provisions have been provided to group these ports into port sets. See Figure 1-31.

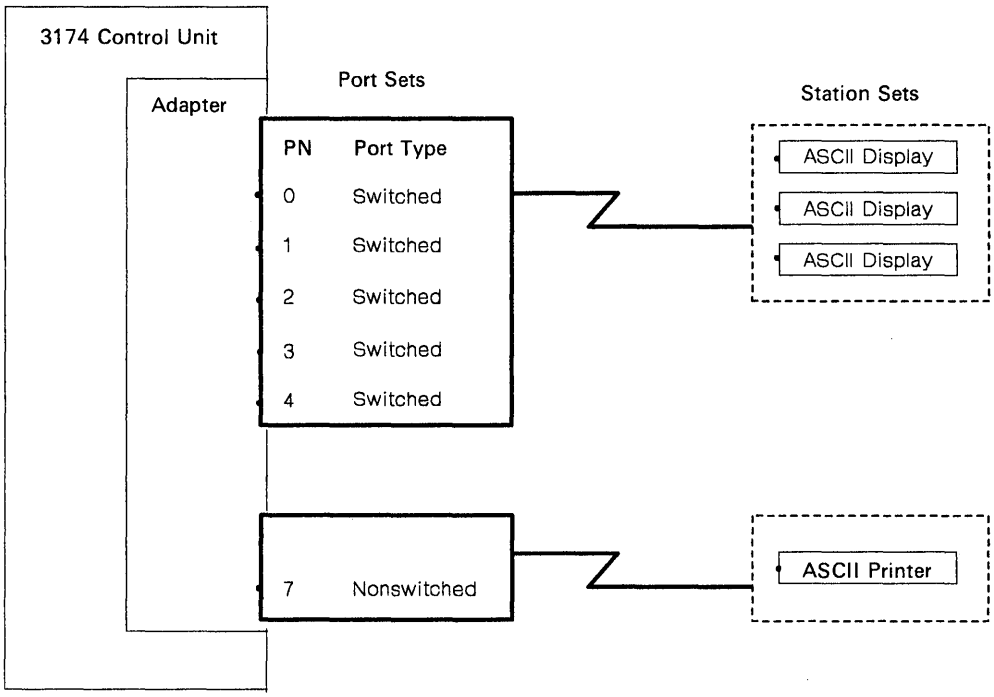


Figure 1-31. Port Sets

Port sets may be used by more than one display station set providing the station type of the station sets are different. Different station types are required because the controller cannot identify which station set to connect if both station sets have the same station type and port type. See Figure 1-32.

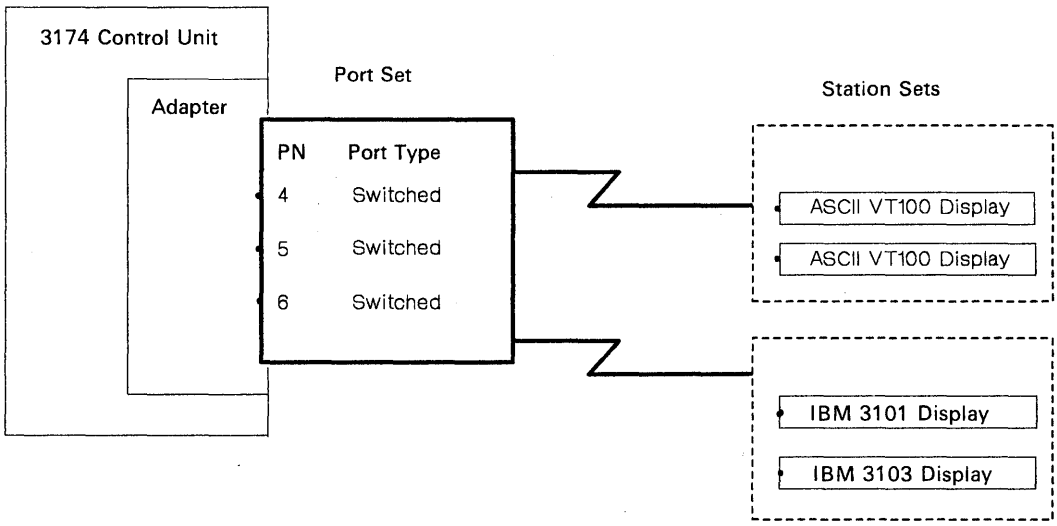


Figure 1-32. Connected Terminal and Port Sets

Power Supply Description

The 3174 power supply is a transistor regulator (TSR) power supply, which combines the DC power supply and the AC prime power control section into one field replaceable unit (FRU). Two power supplies are available.

- Low voltage: 100 – 120 Vac 50/60 Hertz single phase
- High voltage: 200 – 240 Vac 50/60 Hertz single phase.

Power Supply Problem Determination

The power supply is designed to operate when it is unseated from the logic board to assist in power supply problem determination. In addition, an AC and a DC indicator are on the power supply to help isolate power supply failures.

AC Indicator

The AC indicator is a green indicator located on the front of the power supply. This indicator is visible when the front cover of the controller is open. This indicator turns on when the controller power cable is plugged into a live outlet to verify that the AC voltage is present at the input of the power supply.

DC Indicator

The DC indicator is a green indicator located on the front of the power supply next to the AC Power on/off switch. This indicator is visible when the front cover of the controller is open or closed. This indicator turns on when all voltage levels are within the proper tolerances at the power supply. Voltage-sensing circuits in the power supply will shut down the supply if a voltage is not within the proper limits. The DC indicator turns off if one of the following conditions exists:

1. The power supply 'power on reset' line is in a constant down (minus) condition.
2. The power supply DC voltages are not within the proper tolerances.
3. Logic card(s) or the logic board is loading down a voltage or the 'power on reset' line.

The power supply can be unseated to isolate this failure. If the DC indicator stays off, the first or second condition is causing the failure. If the DC indicator turns on, then the third condition is causing the failure. Following an overload condition as described above (and the cause of the overload is removed), wait a minimum of 2 seconds before turning on power, to ensure that the power supply has recovered from the previous overload condition. If the DC indicator is on and a voltage is missing at the test points on the logic board, there is either an open land pattern on the logic board or a bad connection between the power supply and the logic board in board location 25.

DC Voltage Test Points

The DC voltages can be checked at the test pins located next to board location 11. See Figure 1-33. The connector on the power supply that plugs into the logic board is shown in Figure 1-34 on page 1-50. For voltage tolerances, see Table 1-5 on page 1-49. The fans and the diskette and fixed disk drive motors operate on DC voltages.

Note: The power supply problem isolation concept is to replace the supply as a single FRU. Normally, voltages do not have to be measured for proper tolerances unless directed by a maintenance analysis procedure (MAP).

CAUTION:
Do not open the power supply to check for a defective fuse. (For translations of this safety notice, see Safety Notice 11 in *IBM 3174 Safety Notices*, GA27-3824.)

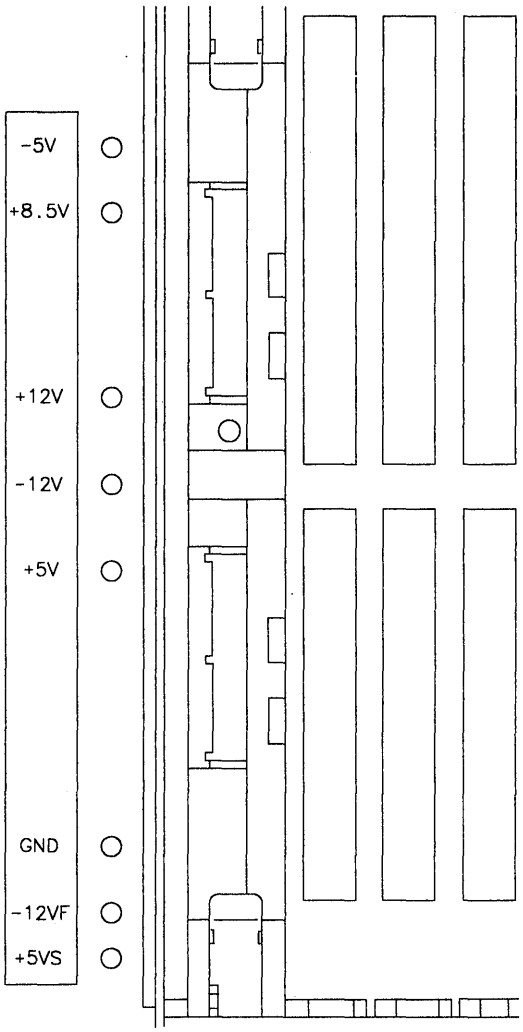


Figure 1-33. Logic Board Voltage Test Points

Power Supply Voltage Chart

The voltages listed in Table 1-5 are present in the 3174 and can be measured at the test points located next to board location 11. The decal next to the pins shows the location of the ground pins and voltage pins.

Table 1-5. DC Voltage Chart

Voltage	Test Point at Decal	DC Limits
- 5.1	See decal	-4.55 to -5.4
+ 8.5	See decal	+ 7.82 to + 9.27
+ 12	See decal	+ 11.4 to + 12.72
-12	See decal	-10.92 to -12.96
+ 5.1	See decal	+ 4.85 to 5.3
-12F	See decal	-10.61 to -13.08
+ 5S	See decal	+ 4.85 to 5.3

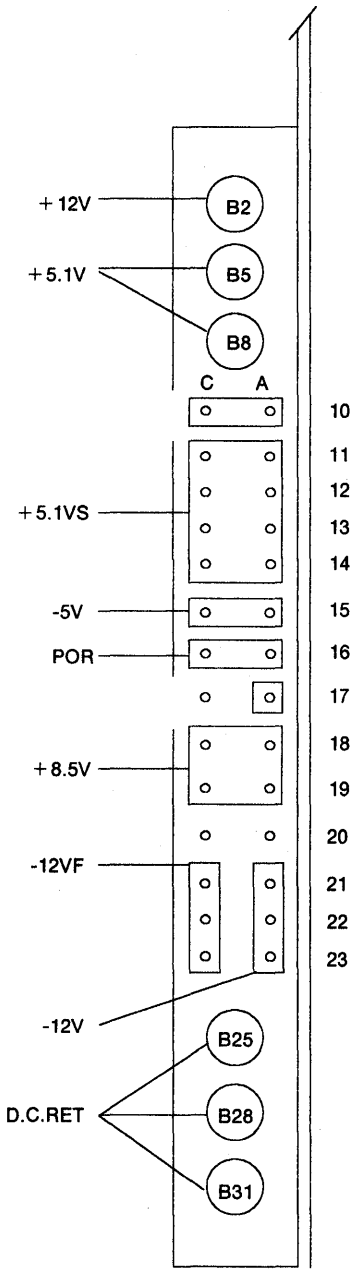


Figure 1-34. Power Supply Connector

AC Mainline Disconnect

The 3174 does not have a prime-power mainline on/off switch. This switch is normally used to disconnect AC input line voltage in the prime power box. The AC input line voltage for all 3174 models is disconnected by removing the power cable from the power supply socket.

CAUTION:
Switch power off and unplug the power cord from the outlet before detaching the power cord from the controller. (For translations of this safety notice, see Safety Notice 7 in *IBM 3174 Safety Notices*, GA27-3824.)

Host System Power Control and Sequencing

The 3174 Models 1L and 11L can be switched on or off remotely through the host system if a power control sequence cable is connected to the controller, the AC Power control switch is in the Remote position, and the power switch is in the on (|) position. If the AC Power control switch is in the Local position, power is turned on or off at the controller.

See Figure 1-35 in the sequences that follow.

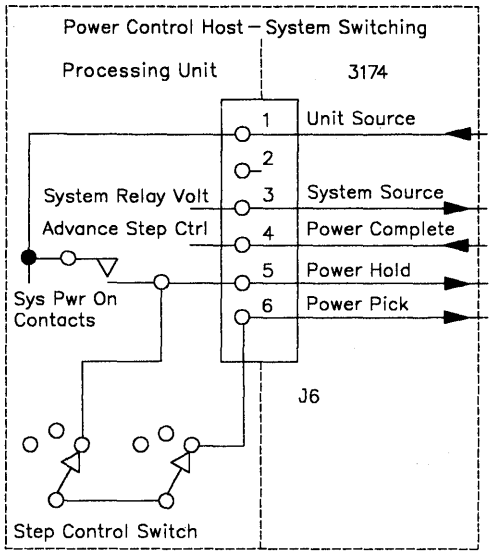


Figure 1-35. Power Control Connector J6

Host System Remote Power-On Sequence: (See Figure 1-35.)

1. The host system *power-on contacts* close.
2. *System source* voltage is sent to all attached controllers.
3. Control *unit source* voltage is sent to all controllers and is returned to each controller as the *power hold line* (after passing through the power on/off contacts for each unit).
4. The *step control switch* advances to the first position.
5. A path from *power pick* to *power hold* is completed for the unit connected to the first step position.
6. If a controller Local/Remote switch is set to Local, the power-on sequence for that controller, because of making *power pick* active, does not take place. Instead, the path from *system source* to *power complete* is completed through the Local/Remote switch. If the Local/Remote switch on a controller is set to Remote and the power switch is in the on (|) position, controller power-on takes place. When the sequence is completed, the controller closes the path from *system source* to *power complete*.
7. When *power complete* is received at the system, the *step control switch* advances to the next position and opens *power pick* to the controller that just turned on.
8. Steps 5, 6, and 7 are repeated until all attached controllers are turned on.

Host System Remote Power-Off Sequence:

(See Figure 1-35 on page 1-51.)

1. The host system *power-on contacts* open.
2. The *power hold* line opens.
3. If the controller Local/Remote switch is in the Remote position, the controller turns off. The *unit source* line remains active (up), and the *power complete* line opens.
4. If the controller Local/Remote switch is in the Local position, then no change in the controller power status occurs.

The power control and sequence cable plugs into position J6, located at the bottom of the power supply next to the AC power cord. The cable has a 6-pin connector with three lines coming from the host processing unit. Three of the wires in the cable are used to receive signals from the host; the other two wires are used to send signals to the host. See Figure 1-35 on page 1-51 and the following paragraphs for a description of the signals.

J6 connector pin 1 provides +24 V to the host system. This voltage is always present when the 3174 is plugged into an AC outlet.

Pin 2 EPO control is not used in the 3174.

Pin 3 is the +24 V *system source* line from the host system. This line is returned on pin 4 by the 3174 to tell the host system that 3174 power-on is completed.

Pins 5 and 6 are used to power on the 3174 remotely from the host system. When the power switch in the host system is turned on, all attached controllers are sequenced up one at a time. This is accomplished by a *step control switch* in the host system. When it is time to power on the 3174, +24 V is applied to pin 5 and then pin 6 to pick and hold a relay in the 3174 power supply to complete the 3174 power-on sequence.

When the power switch in the host system is turned off, +24 V is removed from pin 5 and the 3174 powers off if the AC power control switch is in the Remote position.

If a power control and sequence cable is not used, the 3174 power supply is designed to power on without the use of a jumper plug installed in connector J6. The AC power control switch must be in the Local position to power on the controller.

Warning: If a power control and sequence cable is not connected to the controller and a jumper plug is not installed, the 3174 will drop power when the AC power control switch is set from Local to Remote. To prevent this, install a white jumper plug with pins 1 and 5 connected together into connector J6.

Emergency Power Off (EPO): Emergency power off at the system level is accomplished by the building (room) EPO. Emergency power off of the 3174 controller is through the power supply on/off switch regardless of the position of the AC power control switch.

Normal Initial Microcode Load (IML)

A normal IML is required to bring the 3174 to an operational state where the controller can communicate with a host system. A normal IML is started by turning on the controller or by pressing the IML pushbutton after the controller is turned on. IML occurs from the fixed disk with a Control diskette image or the first diskette drive that has a Control diskette installed. The device selection order is fixed disk 1, fixed disk 2, diskette drive 1, then diskette drive 2. If a failure or unusual status condition occurs during any portion of the IML sequence, a status code will be displayed on the 3174 operator panel. Models 1L and 11L establish the connection to the channel when the IML is completed if the Channel Interface switch is in the Online position and the channel interface indicator is off. During a normal IML, the following tests run:

1. Processor card ROS tests
2. File adapter pretest
3. First storage card
4. Extended tests load from the disk/diskette
5. Extended processor card tests
6. Remainder of storage.

Alt 1 IML Operations

This section contains all the operations that can be selected after an Alt 1 IML is performed. Alt 1 IML provides the capability to run offline tests, customize, and perform a normal (operational) IML. Chapter 2 contains step-by-step procedures for running offline tests. For information about customizing, see the *3174 Planning Guide*.

Alt 1 IML Procedures

Before starting this procedure, note the following:

- If the function selection number being used is 41, 42, or 43, Control microcode on a diskette or fixed disk is required
- If the function selection number being used is 40, 80, 81, 82, or 87, Utility microcode on a diskette or fixed disk is required.

When performing the Alt 1 IML procedure, select the parameters from Table 1-6 on page 1-54.

1. If you are going to perform an Alt 1 IML from diskette, insert the proper diskette at this time.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. At 40, key in the IML device (DS) and the function selection (FS).
6. Press Advance and go to step 7, or press Enter to execute.
7. Key in the test parameter (TP) (valid only with 8x functions).
8. Press Enter.

Table 1-6. Alt 1 IML Device, Function, and Parameter Selections
DS = IML device selection = 01 = Diskette drive 1 without storage initialization = 02 = Diskette drive 2 without storage initialization = 03 = Fixed disk 1 without storage initialization = 04 = Fixed disk 2 without storage initialization = 08 = Auto IML device selection without storage initialization (Note 4) = 11 = Diskette drive 1 with storage initialization = 12 = Diskette drive 2 with storage initialization = 13 = Fixed disk 1 with storage initialization = 14 = Fixed disk 2 with storage initialization = 18 = Auto IML device selection with storage initialization (Note 4)
FS = Function selection = 40 = Display Master Menu at port 0 = 41 = Normal IML = 42 = Access Host Backup level changes = 43 = Access Host Trial level changes = 44 = Reserved = 45 = Reserved = 80 = Load test control monitor = 81 = Test All (CSU mode) = 82 = Test All (Installed Mode) (same as Alt 2 IML) = 87 = Test Processor and Storage
TP = Test Parameter (used only with 8x function selections) = 90 = No Options - Default = 91 = Loop = 92 = Stop on error = 93 = Loop, stop on error = 94 = Terminal control = 95 = Loop, terminal control = 96 = Stop on error, terminal control = 97 = Loop, stop on error, terminal control

Notes:

1. If an IML device (DS) is not entered, ROS will default to DS = 01.
2. If no input parameters are entered (Enter pressed without any data), ROS will default to DSFS = 0140.
3. If storage initialization is bypassed, ROS will bypass the tests for the file adapter.
4. Auto IML device selection causes ROS to try to load operational microcode from each IML device. Device search order is fixed disk 1, fixed disk 2, diskette drive 1, and then diskette drive 2. (This is true only for 08 and 18.) If another selection is made and a diskette is not present, an error will occur.
5. Test function 80, 81, 82, or 87 can be selected in response to the 40 prompt message. You select individual tests only after selecting an 8x function first and obtaining the 4001 prompt message.
6. Test function 81 has special setup requirements necessary to complete successfully. For details, see "Test All 81 (CSU)" on page 2-114.
7. Test function 82 should be performed at any time after the controller has been installed. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Alt 1 Normal IML Description

An Alt 1 normal IML is used to load operational microcode from a specific diskette or fixed disk drive. A configured Control diskette must be installed in the diskette drive that is selected as the IML drive. If your 3174 has a fixed disk drive, the configured diskette may be copied onto the fixed disk. During an Alt 1 Normal IML, the following tests run:

1. Processor card ROS tests
2. First storage card
3. File adapter pretest
4. Extended tests load from the diskette or fixed disk
5. Extended processor tests
6. Remainder of storage.

Alt 1 Normal IML Procedure

To perform an Alt 1 Normal IML, use the following procedure:

Format = DS41

1. Select the IML device (DS) and storage option. See Table 1-6 on page 1-54.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. At 40, key in **DS41**
   Press Enter; execution begins.

Example of an Alt 1 IML
Where:

12 = Diskette 2 with storage initialization
41 = Normal IML

1. Press and hold Alt 1.
2. Press and release IML.
3. Release Alt 1.
4. At 40, key in **1241**
5. Press Enter; execution begins.

Alt 2 IML Procedures (Test 82)

This section describes how to run Test 82. There are two procedures available. The procedure you use depends on where the Utility microcode is stored.

- If on a diskette, use "Procedure — A Test 82"
- If on a fixed disk, use "Procedure B — Test 82" on page 1-57

The following tests are performed on the installed FRUs during an Alt 2 IML (Test 82):

1. Processor card ROS tests
2. First storage card test
3. File adapter pretest
4. Extended tests load from the diskette or fixed disk
5. Extended processor card instruction tests (HG 87)
6. Extended timer tests (HG 08).
7. Additional storage cards (HG 87)
8. File adapter (HG 01) and file drive tests (HG 01, 02, 03, and 04)
9. Communication adapter tests (no wrap tests) (HG 11)
10. Concurrent Communication Adapter test (no wrap tests) (HG 51 and 52)
11. Channel adapter tests (no wrap tests) (HG 16)
12. Asynchronous Emulation Adapter (no wrap tests) (HG 21, 22, and 23)
13. Terminal adapter tests (no wrap tests) (HG 26)
14. Token-Ring adapter tests (no wrap tests) (HG 31)
15. Encrypt/Decrypt tests (HG 46)

Most errors that occur during an Alt 2 IML will not stop the test unless it is a critical failure, such as a diskette drive problem. Errors are stored in the test error log and are displayed at the end of the test for analysis. An Alt 2 IML runs from 1 to 3 minutes.

Procedure — A Test 82

Warning: This procedure interrupts all host services. Notify the users if necessary.

1. Have the host operator take the controller offline.

   For a Models 1L and 11L only, set the Channel Interface switch to Offline.

   Wait for the offline indicator to light.

2. Insert the Utility diskette into drive 1. If the controller has two diskette drives, install a Control or valid 3174 diskette into drive 2 making sure that if the diskette is marked 2.4MB, the drive is also marked 2.4.
3. Press and hold Alt 2.
4. Press and release IML.
5. Release Alt 2.

The test will run and progress numbers appear in the Status display on the operator panel. The test lasts from 1 to 3 minutes. If the test runs successfully, 2082 will be displayed. If the test stops with a number other than 2082, look up that number in the *3174 Status Codes* manual.

Note: An Alt 2 IML can also be performed using a Control diskette in drive 1. However, only tests 1 through 6 above are run.

Procedure B — Test 82

Important: One of the steps in this procedure tells you to do an Alt 1 IML. This is necessary because as part of the procedure, you select which fixed disk you are going to use. This test can only be run if the Utility diskette image is on the fixed disk. **Warning:** This procedure interrupts all host services. Notify the users if necessary.

1. Have the host operator take the controller offline.

   For Models 1L and 11L only, set the Channel Interface switch to Offline.

   Wait for the offline indicator to light.
2. Insert a valid 3174 diskette into drive 1. If the controller has two diskette drives, install a valid 3174 diskette in drive 2 making sure that if the diskette is marked 2.4MB the drive is also marked 2.4.
3. Press and hold Alt 1.
4. Press and release IML.
5. Release Alt 1.
6. At 40, key in **HG82** where:
   HG = 03 = Fixed Disk 1
   HG = 04 = Fixed Disk 2
   82 = Load and run Test 82.
7. Press Enter.

The test will run and progress numbers appear in the Status display on the operator panel. The test lasts from 1 to 3 minutes. If the test runs successfully, 2082 will appear in the Status code display. If the test stops with a number other than 2082, look up that number in the *3174 Status Codes* manual.

Environmental Restrictions

This section provides some of the environmental classifications and tolerances for the 3174 Establishment Controller. If an environmental problem is suspected, contact your local IBM branch office installation planning representative. The tolerances shown are for an operational machine at a customer location.

Environmental Classifications

- Pollutants classification = P1
- Gaseous classification = G1
- Vibration classification = V1
- Shock classification = S1
- Temperature and relative humidity classification = C1

3174 Temperature and Humidity Limits

- Operational temperature range is from 10° C (50° F) to 40.6° C (105° F).
- Operational relative humidity range is from 8% to 80%.
- Operational wet bulb is 26.7° C (80° F).

3174 Acoustics

The maximum allowable 3174 adjusted decibels output is 46 Dba.

Special Tools and Test Equipment

The following tools are available for wrap tests on the communication adapter, the channel adapter, the Token-Ring adapter, and the Asynchronous Emulation Adapter in the 3174 Establishment Controller. These tools are available from the branch office or through normal parts distribution:

6123419	EIA/V.35 wrap plug
6423420	X.21 wrap plug
61X4603	V.35 cable wrap plug (shipped with the controller)
6165899	Token-Ring adapter wrap plug
61X4602	Asynchronous Emulation Adapter wrap plug
6246399	Channel wrap block (bus)
56X4892	Channel wrap block (tag).

See "How to Run Communication Adapter Optional Tests" on page 2-134 for details about using the communication adapter wrap plugs and "How to Run the Channel Driver/Receiver Wrap Test (FN 01)" on page 2-140 for details about using the channel adapter wrap blocks.

EIA/V.35 Wrap Plug

The EIA/V.35 wrap plug (P/N 6423419) is used to test the Type 1 communication adapters. See Figure 1-36. This wrap plug can be connected directly to the adapter card or on the end of the EIA cable and the V.35 cable with three Test/Oper switches.

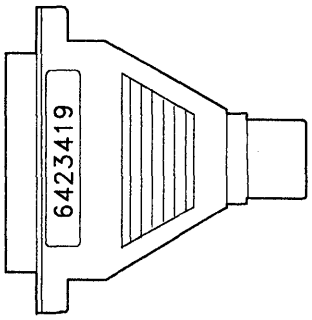


Figure 1-36. EIA/V.35 Wrap Plug

X.21 Wrap Plug

The X.21 wrap plug (P/N 6423420) is used to test the Type 2 communication adapters. See Figure 1-37. This wrap plug can be connected directly to the adapter card or on the X.21 interface cable.

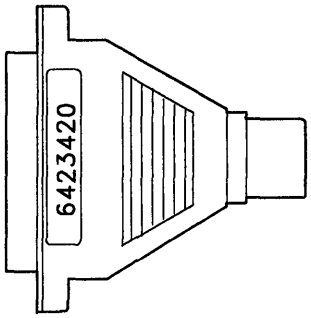


Figure 1-37. X.21 Wrap Plug

V.35 Cable Wrap Plug

The V.35 cable wrap plug (P/N 61X4603) is used to test the V.35 cables that have one Test/Oper switch on the end of the cable. This cable is shipped with early-production machines. Later machines have three Test/Oper switches on the interface cable. This wrap plug can be connected to the end of the cables with one Test/Oper switch.

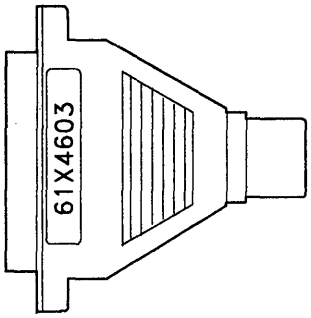


Figure 1-38. V.35 Wrap Plug

Token-Ring Adapter Wrap Plug

The Token-Ring adapter wrap plug (P/N 6165899) is used to test the Token-Ring adapter. This wrap plug is connected directly to the adapter card. See Figure 1-39.

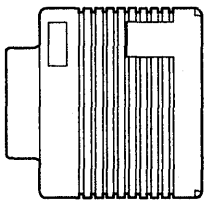


Figure 1-39. Token-Ring Adapter Wrap Plug

Asynchronous Emulation Adapter Wrap Plug

The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) is used to test the Asynchronous Emulation Adapter port and, in some cases, the communication cable. See Figure 1-40.

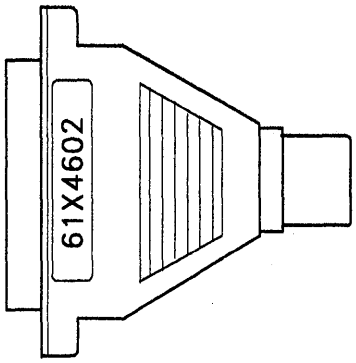
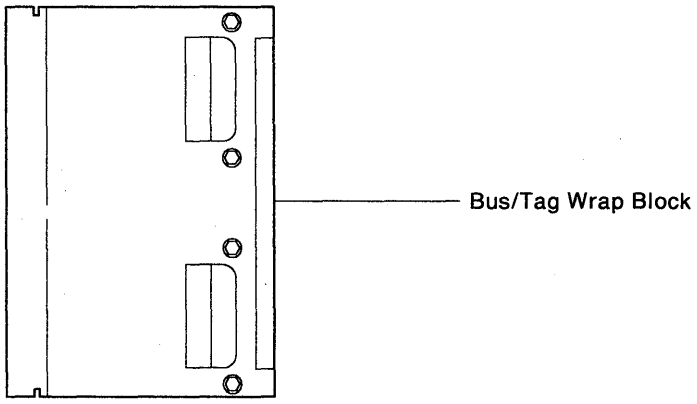


Figure 1-40. Asynchronous Emulation Adapter Wrap Plug

Channel Wrap Blocks

The channel bus and tag wrap blocks are used to test the driver/receiver circuitry at the bus and tag tailgate assembly. These wrap blocks are normally installed in the controller when the test is performed. However, they can be attached to the end of the Tag In and Bus In channel cables to test the cables. See Figure 1-41.



Tag In Wrap Block (PN 56X4829)
Bus In Wrap Block (PN 6246339)

Figure 1-41. Channel Wrap Blocks (Bus and Tag)

Chapter 2. Diagnostic Information

Introduction

This chapter contains the charts used for 3174 problem determination, the maintenance analysis procedures (MAPs), offline and online tests, general procedures, and host online tests (370/OLTs).

Start

Initial Symptom Chart

Scan the following chart sequentially and match your symptom to a symptom in the chart; then go to the action for that symptom. In the MAPs and the *3174 Status Codes* manual, multiple FRUs may be listed for replacement for certain failures. The replacement strategy is to swap each FRU one at a time until the machine stops failing. The most likely FRU is always listed first.

No.	Symptom	Action
1	DC Power indicator is off.	Go to "MAP 0700: DC Power Indicator Is Off" on page 2-58.
2	Status code or alternating codes.	Go to the *3174 Status Codes* manual. If the code is not found in the *3174 Status Codes* manual, go to "MAP 0110: Operator Panel Isolation" on page 2-10. If multiple status codes are displayed, see "Multiple Operational Status Codes" on page 1-20.
3	Check Cond indicator is on with blank Status indicators.	Go to "MAP 0100: Check Cond Indicator Is On with Blank Status Indicators" on page 2-8.
4	Status code not indicated or known.	Go to "MAP 0120: Status Code Not Indicated or Known" on page 2-12.
5	Operator panel failures.	Go to "MAP 0110: Operator Panel Isolation" on page 2-10.
6	3270 Terminal(s) or printers(s) failing.	Go to "MAP 0200: Terminal(s) or Printers(s) Problem Entry" on page 2-13.
7	ASCII Host/Terminal device(s) failing.	Go to "MAP 1000: ASCII Problem Entry" on page 2-78.
8	Token-Ring Network attachment problems.	Go to "MAP 0610: Token-Ring Network 3174 Isolation" on page 2-55.
9	Channel-attached 3174 (Models 1L and 11L): All problems between the host/channel and the 3174.	Go to "MAP 0900: Channel Problems" on page 2-70.
10	Type 1 or Type 2 (HG11) communication adapter failures. All problems between the remote host and 3174.	Go to "MAP 0300: Host Remote 3174 Isolation" on page 2-35.
11	The IML fails to start only after power is switched on.	This failure may display a blank, 8888, or any other code. Exchange the power supply. Be sure to use the same type/part number for your replacement.

No.	Symptom	Action
12	Fan(s) are not turning.	Check that the fan assemblies are properly installed. Repair or exchange as needed. Check that the power supply is properly seated. Measure the voltages for proper limits at the logic board. See "Logic Board Removal/Replacement" on page 3-20. If voltages are missing or incorrect, see the following Voltage symptoms.
13	Voltage	Measure voltages for proper limits at the board. See Table 1-5 on page 1-49. If voltage(s) are missing, then visually inspect the power supply plug and board socket location for defects. See Figure 1-34 on page 1-50. Exchange the power supply. Exchange the logic board. See "Logic Board Removal/Replacement" on page 3-20.
14	Board socket pin(s) are bent or broken.	Consider this problem after a part insertion and the problem is not fixed or the status code has changed. Visually inspect the affected board socket(s) for bent or broken pins.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching off power. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

Warning: Do not place any electrical or mechanical equipment on top of a 3174 Establishment Controller. It may cause electrical interference.

MAP 0100: Check Cond Indicator Is On with Blank Status Indicators

Symptom Explanation	Conditions That Could Cause This Symptom
The Check Cond indicator is lit, indicating a pending status code or a failing 3174.	• The 3174 status code is pending. • The 3174 hardware or software is failing.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

– Press the Enter key, and check the status indicators for a status code.

Are the status indicators blank (no lights)?

Yes **No**

002

– Use the status code to find the repair action in the *3174 Status Codes* manual.

003

– While pressing IML, verify that the status indicators display an 8888 code.

Is 8888 **displayed?**

Yes **No**

004

– Replace the operator panel adapter card in location 5.
– Replace the operator panel in location 6.

005

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Was the Alt 2 IML successful (2082 **displayed)?**

Yes **No**

006

– Use the status code to find the repair action in the *3174 Status Codes* manual.

007

Is the Check Cond indicator still on?

Yes **No**

008

– Go to Step 010 on page 2-9.

009

- Exchange the processor card in location 18.
- Exchange the operator panel adapter card in location 5.
- If the failure continues, use your support structure for aid.

010

(From step 008)

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-53.
- Switch power off and then on.

Was the IML successful?

Yes **No**

011

Replace the power supply.

Note: Be sure to use the same type/part number for your replacement.

012

- Return the 3174 to the customer.

MAP 0110: Operator Panel Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The operator panel is failing in one or more of its functions.	• Defective operator panel in location 6. • Defective operator panel adapter card in location 5. • Defective processor card in location 18. • Interaction from other hardware failure. Go to Step 005 to isolate the problem.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

– While pressing IML, verify that the Status indicators display an 8888 code.

Is 8888 displayed?

Yes **No**

002

– Replace the operator panel in location 6.
– Replace the operator panel adapter card in location 5.

003

– Press and hold IML again, and verify that the indicator light on the processor card in location 18 is **ON**.

Did the processor card indicator light?

Yes **No**

004

Replace the processor card in location 18.

005

– Load the Test monitor.
– See "How to Load the Test Monitor" on page 2-119. Return here and continue with this MAP.

Is 4001 displayed?

Yes **No**

006

(From step 008)
– Replace the operator panel in location 6.
– Replace the operator panel adapter card in location 5.
– Replace the processor card in location 18.

007

(Step **007** continues)

007 (continued)

– Run the operator panel test. Key in **09**, and press Enter to display the 4505 prompt message.

Is 4505 **displayed?**

Yes **No**

008

Go to Step 006 on page 2-10.

009

– Press the following operator panel keys, and visually verify the expected codes.

Key Pressed	Char. Displayed in All Four LEDs
0–9	0-9
Clear	E
Alt 1	H
Alt 1 (again)	(–) dash
Alt 2	L
Alt 2 (again)	(blank)
Advance	P

Were the key codes correct?

Yes **No**

010

– Replace the operator panel in location 6.
– Replace the operator panel adapter card in location 5.

011

– Press any number key (0–9), and observe the following sequence:
– The Check Cond indicator (red) goes off.
– Then the Data Transfer indicator (green) goes on for about 2 seconds.
– Then about 5 seconds later the Check Cond indicator (red) goes on.
– Press the Enter key.

Is 2009 **displayed?**

Yes **No**

012

– Replace the operator panel in location 6.
– Replace the operator panel adapter card in location 5.

013

– Press the Enter key to end the test.
– Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-53.

Note: If you entered this MAP because the code was not found in the *3174 Status Codes* manual, use your support structure for aid.

MAP 0120: Status Code Not Indicated or Known

Symptom Explanation	Conditions That Could Cause This Symptom
Status code not indicated at the 3174 Operator panel, or status code is not known.	• Status code is indicated at the failing display. • Status code is stored in 3174; use test 1 event log.

001

Try to obtain a status code by the following:
- Check a failing display.
- At a working 3278 or equivalent display, use test 1 event log (option 2). See "Test 1: Display Logs Menu" on page 2-169.

Did you find a status code?

Yes **No**

002

Continue with the next symptom in the "Initial Symptom Chart" on page 2-6.

003

Use the status code to find the repair action in the *3174 Status Codes* manual.

MAP 0200: Terminal(s) or Printers(s) Problem Entry

001

Scan the following chart sequentially and match your terminal failure with one of the symptoms in the chart; then take the action specified for that symptom.

SYMPTOM	ACTION
Status code 3233 or 399 09	Go to Step 005.
All attached terminal devices are failing	Go to Step 002.
One or more attached terminal devices are failing	Go to "MAP 0210: Terminal Adapter Card Isolation" on page 2-15.
Symptom not known	Run the Device Summary Test (3) (See "Test 3: 3270 Device Status Information" on page 2-177) or get more information from the customer and use this Symptom Chart again.

002

(From step 001)

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

003

Use the status code to find the repair action in the *3174 Status Codes* manual.

004

Further isolation is required. Go to "MAP 0210: Terminal Adapter Card Isolation" on page 2-15.

005

(From step 001)

– Press the Advance key as many times as required to display the card type(s) and location(s) of the failing Terminal Multiplexer adapter card(s).

– Verify that the Terminal Multiplexer card input cable(s) is correctly attached and is connected to a terminal adapter card port (0,8,16, or 24). See Figure 1-3 on page 1-8.

(Step **005** continues)

005 (continued)
Is the cable correctly attached?

Yes **No**

006

- After connecting the coax cable(s), perform a normal IML to return the 3174 to operational status. See "Normal Initial Microcode Load (IML)" on page 1-53.
- Verify the repair action.

007

- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.
- When status code 3233 is displayed, press the Enter key on the operator panel to display the 4001 prompt message.
- Note the failing terminal adapter card port number (0, 8, 16, 24) as determined in Step 005, and go to Step 003 (ENTRY POINT A) of "MAP 0210: Terminal Adapter Card Isolation" on page 2-15.

MAP 0210: Terminal Adapter Card Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal device(s) failing.	• Defective terminal adapter card (see **Note**). • Defective terminal adapter output cable at one of its ports. • Multiple device problems.

Note: You can determine the physical location of the terminal adapter card by checking card locations 21, 22, 23 for the card with coax connectors labeled 0, 8, 16, 24.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Is the failing port number known?
Yes **No**

002

To identify the failing port, use:

a. The Subsystem Cabling Worksheets, and see Figure 1-3 on page 1-8.
b. Online Test 3. See "Test 3: 3270 Device Status Information" on page 2-177.

Then continue with Step 003.

003

(From step 002)
- Run a wrap test to the failing port at the terminal adapter card. (Use online test 10 option 1,xx (xx=00,08,16,24)).

  Note: **00**=Port 0-7, **08**=Port 8-15, **16**=Port 16-23, **24**=Port 24-31.

  See "Test 10: Port Wrap Tests" on page 2-209. If unable to run online use the following offline method.
- Install the Utility diskette into drive 1.

ENTRY POINT A (from Step 007 in MAP 0200)
- See "How to Load the Test Monitor" on page 2-119. If status code 3233 is displayed, press the Enter key to display the 4001 prompt message.
- Key in **2601** and press Advance.
- Key in the port number as labeled at the terminal adapter card, 00, 08, 16, or 24 and press Enter.

  Note: **00**=Port 0-7, **08**=Port 8-15, **16**=Port 16-23, **24**=Port 24-31.

- Use the display message or see the *3174 Status Codes* manual to verify your wrap test results for success or failure.

(Step **003** continues)

003 (continued)
Does the status code indicate a failure?
Yes **No**

004

Go to Step 008.

005

Note: The failure may have been caused by signal reflections from the cable or by a shorted cable.

- Disconnect the failing port's output cable at the terminal adapter card.
- Run the wrap test to the failing port again.

Does the failure still occur?
Yes **No**

006

- Reconnect the port output cable.
  Go to Step 008.

007

- Replace the terminal adapter card in location 22 or 23 or replace the file/terminal adapter card in location 21.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

008

(From steps 004 and 006)
Is the problem a Status Code 3233 failure?
Yes **No**

009

Go to "MAP 0220: Terminal Attachment Configuration Chart" on page 2-17.

010

- Check the TMA input cable for an open or shorted condition.

Is the TMA input cable defective?
Yes **No**

011

- Replace the TMA card.

  Note: If the card is not available, perform a normal IML. Then, bypass the status code (3233) keying in a 1 and pressing the Enter key to allow the normal IML to proceed.

012

- Repair or replace the TMA input cable.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

MAP 0220: Terminal Attachment Configuration Chart

To use this symptom chart you must be able to determine your device configuration (how the devices are connected to the 3174).

To identify your device configuration use:

1. The Subsystem Cabling Worksheets.
2. The customer's equivalent subsystem cabling configuration.

001

Scan the following chart sequentially and match your failing device location and its cable to one of the attachments in the chart; then take the appropriate action.

SYMPTOM	ACTION
Device(s) attached to a TMA card in the 3174.	Go to "MAP 0230: TMA Card Isolation" on page 2-18.
Device(s) attached to a 3299 Model 2, 3 (wrappable).	Go to "MAP 0240: 3299 Model 2, 3 Isolation" on page 2-23.
Device(s) attached to a 3299 Model 1 (nonwrappable).	Go to "MAP 0250: 3299 Model 1 Isolation" on page 2-29.
Device attached directly to a terminal adapter card port.	Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

MAP 0230: TMA Card Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal device(s) attached to an internal adapter (TMA) card fail.	• Defective TMA card (see Note). • TMA card input and output cables incorrectly connected. • Defective signal cable to TMA input. • The attached device is failing • The attached device signal cable is failing. • 3299 connected to TMA card. • Multiple device problems.

Note: You can determine the physical location of the TMA card by either:

a. Running a Terminal Multiplexer Wrap Test to a failing output port of the TMA card and pressing the Advance key to display the card type and location, or

b. Physically following the cable from the terminal adapter card output port (0, 8, 16, or 24) to the input of the TMA card. See Figure 1-3 on page 1-8.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Do you know which device(s) is (are) failing?

Yes **No**

002

- Use online Test 3 for the status of all attached devices, or get more information from the customer. See "Test 3: 3270 Device Status Information" on page 2-177.
- Continue with Step 003.

003

(From step 002)
The attachment of a 3299 Terminal Multiplexer in series with a TMA card is an invalid configuration.
Is more than one device attached to the same TMA failing?

Yes **No**

004

A single device attached to the same TMA is failing. Note the failing port number, and go to Step 021 on page 2-20.

005

(Step **005** continues)

005 (continued)
Are all devices attached to the same TMA failing?
Yes **No**

006

One or more devices attached to the same TMA are failing. Go to Step 021 on page 2-20.

007

Note: Either the TMA or its attached input cable is causing the problem.

– Verify that the input and output cables are correctly attached to the TMA. See Figure 1-3 on page 1-8.

Are eight devices attached to the same TMA?
Yes **No**

008

Go to Step 014.

009

Do you have a spare or another TMA in the 3174?
Yes **No**

010

Go to Step 032 on page 2-22.

011

– Swap the TMA with the available TMA.

Does the failure still occur?
Yes **No**

012

Replace the defective TMA.

013

– The TMA input cable is defective.

014

(From step 008)
Isolate the failure to the TMA or its input cable.
– Disconnect all the output cables from the TMA port(s).
– Run a wrap test to all (eight) TMA ports and **stop testing** at the first good port. Run the online test 10 option 2,xx (xx=00-31).

Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the TMA port number 00-07. See "Test 10: Port Wrap Tests" on page 2-209.

– If unable to run online, use the following offline method.
– Install the Utility diskette into drive 1 or use the fixed disk if Utility microcode is on the fixed disk.
– To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.

(Step **014** continues)

014 (continued)
- Key in **2602** and press the Advance key.
- Key in the logical port number of the device, **00-31**, and press Enter.

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the TMA port number 00-07.

- Use the message on the terminal, or see the *3174 Status Codes* manual, to check your wrap test results.

Did all eight ports fail the wrap test?

Yes **No**

015

Reconnect the TMA output cables. Go to Step 035 on page 2-22.

016

Do you have a spare or another TMA in the 3174?

Yes **No**

017

Go to Step 032 on page 2-22.

018

- Swap the TMA with the available TMA, but do not connect the output cables.
- Run the wrap tests again.

Did all eight ports still fail the wrap test?

Yes **No**

019

- Reconnect the TMA output cables.
- Obtain a TMA card if needed, and continue normal operations.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

020

- Reconnect the TMA output cables.
- The TMA input cable is defective.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

021

(From steps 004 and 006)
Isolate the failure to the TMA or to the device and its input cable.
- Run the wrap test to each failing TMA port. Run the online test 10 Option 2,xx (xx=00-31).

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the TMA port number 00-07. See "Test 10: Port Wrap Tests" on page 2-209.

- If unable to run online, use the following offline method.
- To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.
- Key in **2602** and press the Advance key.
- Key in the logical port number of the device, **00-31**, and press Enter.

(Step **021** continues)

021 (continued)

Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the TMA port number 00-07.

– Use the message on the terminal, or see the *3174 Status Codes* manual, to check your wrap test results.

Does the status code indicate a failure(s)?

Yes **No**

022

Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

023

Note: The failure may be caused by signal reflection from the cable.

– Disconnect only the output cable from the TMA port(s) that failed the wrap test.
– Run the wrap test to the failing port(s) again.

Does the wrap test(s) fail again?

Yes **No**

024

– Reconnect the TMA output cable(s). Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

025

Is the failing device the only one attached and configured for this TMA?

Yes **No**

026

– Reconnect the TMA output cable(s). Go to Step 035 on page 2-22.

027

– Verify that the input and output cables are correctly attached to the TMA. See Figure 1-3 on page 1-8.

Do you have a spare or another TMA in the 3174?

Yes **No**

028

– Reconnect the TMA output cable(s). Go to Step 032 on page 2-22.

029

– Replace the TMA with the available TMA, but do not connect the output cable.
– Run the wrap test again.

(Step **029** continues)

029 (continued)
Does the failure still occur?
Yes **No**

030

Obtain a TMA card if needed, and continue normal operation.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

031

- Reconnect the TMA output cable.
- Check the TMA input cable for an open or shorted condition.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

032

(From steps 010, 017, and 028)
- Check the TMA input cable for an open or shorted condition.

Is the TMA input cable defective?
Yes **No**

033

- Replace the TMA card.

034

Repair or replace the TMA input cable.

035

(From steps 015 and 026) device and its input cable.
- At the TMA, move the failing port's cable to a known working port and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
- If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code for an S, 4, or 6 block READY indication on the terminal.
  Warning: When you are swapping device cables and the devices are different or the screen size or features are not the same, addressing problems may occur that can affect system operation.

Is the READY indicator still off?
Yes **No**

036

The TMA is defective.

037

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

MAP 0240: 3299 Model 2, 3 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal device attached to a 3299 Model 2 or 3 fails. **Note:** The 3299 is a repair center product and is not to be serviced by the onsite CE. Problem determination (PD) on the 3299 is a customer responsibility. This MAP has been included to help you do subsystem PD when a 3299 is involved.	• No AC power to the 3299. • 3299 input and output cables incorrectly connected. • Defective signal cable to 3299 input. • Defective 3299. • Attached device failing. • Attached device signal cable failing. • Replacing a 3299-2 with a 3299-1. • Multiple device and signal cable.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Do you know which device(s) is (are) failing?

Yes **No**

002

- Use online Test 3 to get the status of all attached devices, or get more information from the customer. See "Test 3: 3270 Device Status Information" on page 2-177.
- Continue with Step 003.

003

(From step 002)

Is more than one device attached to the same 3299 failing?

Yes **No**

004

A single device attached to the same 3299 is failing. Note the failing port number, and go to Step 023 on page 2-25.

005

(Step **005** continues)

005 (continued)
Are all devices attached to the same 3299 failing?
Yes **No**

006

– Some devices attached to the same 3299 are failing. Go to Step 023 on page 2-25.

007

Note: Either the 3299 or its attached input cable is causing the problem.

– Verify that the input and output cables are correctly attached to the 3299. See Figure 1-3 on page 1-8.
Is the 3299 red indicator on?
Yes **No**

008

– Verify that the power cable is inserted in the 3299 and is also plugged into a working outlet.
– Replace the 3299 with the same model.

009

Are eight devices attached to the same 3299?
Yes **No**

010

Go to Step 016.

011

Do you have a spare 3299 that is the same model?
Yes **No**

012

Go to Step 035 on page 2-27.

013

– Swap the 3299 model 2 or 3 with another 3299 of the same model.
Does the failure still occur?
Yes **No**

014

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

015

The 3299 input cable is defective.

016

(From step 010)
(Step **016** continues)

016 (continued)
Isolate the failure to the 3299 or its input cable.
- Disconnect all the output cables from the 3299 port(s).
- Run a wrap test to all (eight) 3299 ports, and **stop testing** at the first good port. Use online test 10, Option 2,xx (xx = 00-31).

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the 3299 port number 00-07. See "Test 10: Port Wrap Tests" on page 2-209.

- If unable to run online, use the following offline method.
- To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.
- Key in **2602** and press the Advance key.
- Key in the logical port number of the device, **00-31**, and press Enter.

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the 3299 port number 00-07.

- Use the message on the terminal, or see the *3174 Status Codes* manual, and check your wrap test results.

Did all eight ports fail the wrap test?

Yes **No**

017

Reconnect the 3299 output cables. Go to Step 040 on page 2-27.

018

Do you have a spare 3299 that is the same model?

Yes **No**

019

Go to Step 035 on page 2-27.

020

- Swap the 3299 model 2 or 3 with the same model, but do not connect the output port cables.
- Run the wrap tests again.

Did all eight ports still fail the wrap test?

Yes **No**

021

- Reconnect the 3299 output cables.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

022

- Reconnect the 3299 output cables.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.
- The 3299 input cable is defective.

023

(From steps 004 and 006)
(Step **023** continues)

023 (continued)
Isolate the failure to the 3299 or to the device and its input cable.
- Run the wrap test to each failing 3299 port. Use the online test 10 option 2,xx (xx=00-31).

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the 3299 port number 00-07. See "Test 10: Port Wrap Tests" on page 2-209.

- If unable to run online, use the following offline method.
- To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.
- Key in **2602** and press the Advance key.
- Key in the logical port number of the device, **00-31**, and press Enter.

  Note: The port number is the sum of the terminal adapter card port number 00, 08, 16, or 24 and the 3299 port number 00-07.

- Use the message on the terminal, or see the *3174 Status Codes* manual and check your wrap test results.

Does the status code indicate a failure(s)?
Yes **No**

024

Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

025

Note: The failure may be caused by a signal reflection from the cable.

- Disconnect only the output cable from the 3299 port(s) that failed the wrap test.
- Run the wrap test to the failing port(s) again.

Does the wrap test fail again?
Yes **No**

026

- Reconnect the 3299 output cable(s). Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

027

Is the failing device the only one attached and configured with this 3299-2?
Yes **No**

028

- Reconnect the 3299 output cable(s). Go to Step 040 on page 2-27.

029

- Verify that the input and output cables are correctly attached to the 3299. See Figure 1-3 on page 1-8.

Is the 3299 red indicator on?
Yes **No**

030

- Verify that the power cable is inserted in the 3299 and is also plugged into a powered outlet.
- Replace the 3299 with the same model (3299-2).

031

Do you have a spare 3299 that is the same model?

Yes **No**

032

– Reconnect the 3299 output cable. Go to Step 035.

033

– Swap the 3299 model 2 or 3 with the same model, but do not connect the output port cables.
– Run the wrap test again.

Does the failure still occur?

Yes **No**

034

– Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

035

(From steps 012, 019, and 032)

– Reconnect the 3299 output cable(s) if previously disconnected.
– Attach the 3299 input cable to a working or similar device, and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
– If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

Does the display indicate ready (S, 4, or 6 displayed in the operator information area)?

Yes **No**

036

The 3299 input cable is defective.

037

The 3299 is defective. It must be replaced with the same model (3299-2).

Does the failure still occur?

Yes **No**

038

– Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

039

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

040

(From steps 017 and 028) Isolate the failure to the 3299 or to the device and its input cable.

– At the 3299, move the failing port cable to a known working port and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
– If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

  Warning: When you are swapping device cables and the devices are different or the screen size or features are not the same, addressing problems may occur that can affect system operation.

040 (continued)

Is the READY indicator still off?

Yes **No**

041

The 3299 is defective. It must be replaced with the same model (3299-2).

042

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

MAP 0250: 3299 Model 1 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal device(s) attached to a 3299 Model 1 fail (nonwrappable). **Note:** The 3299 is a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on the 3299 is a customer responsibility. This MAP has been included to help you do subsystem PD when a 3299 is involved.	• No AC power to the 3299. • 3299 input and output cables incorrectly connected. • Defective signal cable to 3299 input. • Defective 3299. • Attached device failing. • Attached device signal cable failing. • Multiple device and signal cable.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Do you know which device(s) is (are) failing?
Yes **No**

002

Use online test 3 for the status of all attached devices, or get more information from the customer.
See "Test 3: 3270 Device Status Information" on page 2-177.
Then continue with Step 003.

003

(From step 002)
Is more than one device attached to the same 3299 failing?
Yes **No**

004

A single device attached to the same 3299 is failing. Note the failing port number, and go to Step 019 on page 2-31.

005

(Step **005** continues)

005 (continued)
Are all devices connected to the same 3299 failing?
Yes **No**

006

Some attached devices to the same 3299 are failing. Go to Step 028 on page 2-32.

007

Note: Either the 3299 or its attached input cable is causing the problem.

– Verify that the input and output cables are correctly attached to the 3299. See Figure 1-3 on page 1-8.

Is the 3299 red indicator on?
Yes **No**

008

– Verify that the power cable is inserted into the 3299 and is also plugged into a working outlet.
– Replace the 3299.

009

Do you have a spare 3299 Model 1 or Model 2?
Yes **No**

010

Go to Step 014.

011

– Swap the 3299 with the spare 3299.

Does the failure still occur?
Yes **No**

012

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

013

The 3299 input cable is defective.

Note: Also consider the possibility of multiple device problems.

Further isolation is required. Go to Step 031 on page 2-32.

014

(From steps 010 and 024)
Isolate the failure to the 3299 or its input cable.
– Attach the 3299 input cable to a working display or similar device, and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
– If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

(Step **014** continues)

014 (continued)

Does the display indicate ready (S, 4, or 6 displayed in the operator information area)?

Yes **No**

015

The 3299 input cable is defective.

016

Replace the 3299.

Does the failure still occur?

Yes **No**

017

– Continue normal operations.

018

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

019

(From step 004)

Is the failing device the only one attached and configured with this 3299 Model 1?

Yes **No**

020

Go to Step 028 on page 2-32.

021

Note: Either the 3299 or its attached input cable is causing the problem.

– Verify that the input and output cables are correctly attached to the 3299. See Figure 1-3 on page 1-8.

Is the 3299 red indicator on?

Yes **No**

022

– Verify that the power cable is inserted in the 3299 and is also plugged into a working outlet.
– Replace the 3299.

023

Do you have a spare 3299 Model 1 or Model 2?

Yes **No**

024

Go to Step 014 on page 2-30.

025

– Swap the 3299 with the spare 3299.

(Step **025** continues)

025 (continued)
Does the failure still occur?
Yes **No**

026

Continue normal operations.

027

The 3299 input cable is defective.

Note: Also consider the possibility of a device problem.
Further isolation is required. Go to Step 031.

028

(From steps 006 and 020)
- At the 3299, move the failing port cable to a known working port and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
- If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

Warning: When you are swapping device cables and the devices are different or the screen size or features are not the same, addressing problems may occur that can affect system operation.

Does the READY indicator go on?
Yes **No**

029

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

030

Replace the 3299.

031

(From steps 013 and 027)
- Attach the 3299 input cable to a working display or similar device, and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
- If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

Does the display indicate ready (S, 4, or 6 displayed in the operator information area)?
Yes **No**

032

The 3299 input cable is defective.

033

Further isolation is required. Go to "MAP 0260: Terminal(s) or Printer(s) Isolation" on page 2-33.

MAP 0260: Terminal(s) or Printer(s) Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A device symptom or status code has indicated that a device does not indicate ready. **Note.** The device may be a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on a device is usually a customer responsibility. This map has been included to help you do subsystem PD when a device(s) is involved.	• The attached device is failing. • The device signal cable is defective. • Defective terminal adapter card. • Defective TMA card. • Defective 3299-1, 3299-2, or 3299-3. • 3290 or Personal Computer is attached to Port 0 during customizing. **Note:** This MAP isolates the device and its signal cable.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

(From step 002)
- If port 0 is the failure, verify that a 3290 is not attached to port 0. If you cannot customize and a personal computer is attached, verify that the personal computer is in the proper mode that allows controller communication.
- If the 3174 subsystem is wired via the IBM Cabling System with two or a multiple of two ports failing, consider the possibility of a problem with the cableless twin balun assembly (which allows connecting two devices to a single wall receptacle). See the *IBM Cabling System Planning and Installation Guide*, GA27-3361.

Has problem determination on the attached device been done?

Yes **No**

002

Use the attached device's documentation to do problem determination.
- Continue with Step 001.

003

Has the failing device been swapped with a working display or similar device?

Yes **No**

004

Go to Step 006 on page 2-34.

005

(From step 006)
(Step **005** continues)

005 (continued)
The problem is isolated to the failing signal cable.

Note: If the problem is not isolated, then one at a time replace the TMA card, the 3299, the terminal adapter card, or any part in the failing device's configuration.

006

(From step 004)
- Swap the failing device with a working display or similar device. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-289.
  - If the READY condition is on, then the 3174 port location is not at fault and the disconnected device is failing.
  - If the READY condition is off, restore the device and cable and continue with Step 005 on page 2-33.
- If offline, perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53) to load operational code.

MAP 0300: Host Remote 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
3174 Controller with a Type 1 or Type 2 communication adapter.	• Defective communication adapter card (HG 11). • Customizing response. • No AC power to modem. • Defective modem cable. • Incorrect modem cable or wrap plug. • Improperly installed modem cable. • Defective modem. • Defective Concurrent Communication Adapters (HG 51 and HG 52). • Communication link failure.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

002

Use the status code to find the repair action in the *3174 Status Codes* manual.

003

Did the problem occur after the 3174 had been working?

Yes **No**

004

– Use Online Test 2, Option 2, to verify that the customizing response numbers are proper for your 3174 options and host link attachment. See "Test 2: Configuration Menu" on page 2-175.
– Continue with Step 005.

005

(From step 004)
Is the attachment a V.35 interface? Determine by checking cable part numbers. See Chapter 6 for part numbers.

Yes **No**

006

– Set the communication cable Test/Oper switch(es) to Test. Go to (ENTRY POINT A) in Step 007 of this MAP.

007

(Step **007** continues)

007 (continued)

– Determine if you have the cable with the three-position switch or one-position switch, Test/Oper switch. Select the following:

- Three switch positions. Set the switch to Test Mode 1 as shown in Figure 2-6 on page 2-136.
- One switch position. See Table 2-7 on page 2-136 and do the three steps of the procedure.

(ENTRY POINT A)

– To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.
– To run the cable wrap test, key in **HG01** (HG = 11, 51, or 52) and press Enter.

Is 2001 displayed?

Yes **No**

008

– Press the Advance key to see the extended information from the status code.
– Match the code XXHG number to one of the following codes:

02HG (cable or wrap plug not connected)

- Check that the modem cable or wrap plug is plugged into the 3174 communication adapter card socket.
- Check that the modem cable is the correct part number. See Chapter 6 for part numbers.
- Replace the communication adapter card.

03HG (cable or wrap plug not providing proper X.21 attachment)

- Check that the cable is not an EIA or V.35 part number. See Chapter 6 for part numbers.
- Replace the communication adapter card.
- Replace the X.21 cable.

2XHG (cable wrap failure; the communication adapter card, modem cable, or wrap plug is defective or the modem cable or wrap plug part number being used is incorrect).

- Go to the *3174 Status Codes* manual, and see code 3030 2XHG. Verify if the 2x code is a cable or wrap plug part number compatibility problem. See Chapter 6 for part numbers.
- If you want to isolate the problem to the ***card*** or ***cable***, run the wrap test with the wrap plug. For part numbers see figures 2-7 through 2-9 on pages 2-137, 2-138, and 2-139.
- Install the card wrap plug, and run the wrap test as previously done in step 007.

009

Is the interface EIA/V.35?

Yes **No**

010

Go to Step 020 on page 2-38.

011

– If you previously did the V.35 wrap test in test mode 1, repeat the wrap test again in test mode 2. See Table 2-7 on page 2-136 and to Step 007 in this MAP. If you previously did the V.35 wrap test with the one switch, reconnect the interface cable to the short modem cable.
– Set the communication cable Test/Oper switch(es) back to Oper.
– To run the modem status test, key in **HG04** (HG = 11, 51, or 52) and press Enter.

(Step **011** continues)

011 (continued)
Is 4513 **displayed?**
Yes **No**

012

Match the failing status code to one of the following and take the appropriate action:
4510 (missing 'data set ready' and 'carrier detect')

- The status test shows that the modem or its connections are causing the problem.
- Verify the communication cable for proper continuity, when the switch(s) is in the operate position.

– or –
4511 (missing 'carrier detect' and 'data set ready' is active).
Verify whether your link should be providing the 'carrier detect' signal.
– Go to (ENTRY POINT B) of this MAP.
– or –
4512 (missing 'data set ready' and active 'carrier detect').
– or –
The status test shows that the modem is causing the problem.
– Go to (ENTRY POINT B) of this MAP.

013

The communication adapter card is receiving 'data set ready' and your link is providing the 'carrier detect' signal.
(ENTRY POINT B)
Is the attachment to an IBM modem?
Yes **No**

014

Notify the customer that either the modem or the communication link is causing the problem.

015

Is the modem wrappable?
Yes **No**

016

The modem or the communications link is causing the problem.

017

– The Test/Oper switch(es) is still set to Oper.
– To run the modem wrap test with the modem clock, key in **HG02** (HG = 11, 51, or 52) and press Enter.
(Step **017** continues)

017 (continued)
Is 20HG **displayed.**
Yes **No**

018

Status Code 3030

– Check the modem for proper operating mode and that it is wrappable.

Note: Do not run the test with the modem set to External Speed Control.

The 3174 modem wrap test shows a defective modem.

019

– The modem is functioning correctly.

Note: Some IBM modems allow you to run further checks. See the modem documentation.

– Verify the operational status of the communication network.

020

(From step 010)
– The Test/Oper switch is still set to Test.
– To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.
– To run the cable wrap test with the modem clock, key in **HG05** (HG = 11, 51, or 52) and press Enter.
Is 20HG **displayed?**
Yes **No**

021

The modem or its connections are causing the problem.

022

– The wrap testing indicates that the 3174 is functioning correctly and was able to run using the modem clock signal.
– Verify the operational status of the communication network and the other modem signals.
– Verify the communication cable for proper continuity when the switch is in the operate position.
– Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

MAP 0400: PIO/CH-IO Bus and ROS Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
This MAP may be entered from status codes 8888, or from another MAP.	• Logic card (location 18) defective. • Logic card (location 21) defective. • Logic card (location 22) defective. • Logic card (location 23) defective. • Logic card (location 24) defective. • Logic card (location 19) defective. • Logic card (location 20) defective. • Operator panel (location 6) defective. • Operator panel adapter card (location 5) defective. • Power supply defective.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

– Verify the status code results after a power-on and then while pressing IML.
– If the 8888 code occurs only after a power-on, exchange the power supply.

Is the DC indicator on?

Yes **No**

002

Go to "MAP 0710: Power Load Isolation" on page 2-60.

003

– Verify that the Data Transfer indicator lights, while pressing IML. After checking the indicator, release the IML switch.

Did the Data Transfer indicator light?

Yes **No**

004

– Replace the operator panel in location 6.
– Replace the operator panel adapter card in location 5.

005

– Visually check the indicator light on the processor card in location 18.

After a power-on or IML, each of the following is an 8888 code failure.

- Card indicator immediately starts blinking.
- Card indicator is on constantly.
- Card indicator fails to come on.

(Step **005** continues)

005 (continued)

Is the card indicator light blinking equally on and off (immediately)?

Yes **No**

006

Go to Step 022 on page 2-41.

007

Is there a card type 9120 in location 21?

Yes **No**

008

In later-production controllers, the file adapter and the terminal adapter cards are packaged on one card in location 21, type 9154. Go to Step 040 on page 2-43

009

– Unseat the following logic cards as a group: locations 22,23.

If a TMA card is installed in location 23 (type 917x), it is not necessary to unseat this card.

– Switch on power.

Is the indicator still blinking equally on and off (immediately)?

Yes **No**

010

– In sequence starting at logic card location 22, reseat the cards that were unseated, one at a time, and then switch on power after you reseat each card. The card indicator should immediately blink on and off again when you reseat the failing card.
– Replace the failing card.

011

– Within the group you just unseated, reseat the terminal adapter card (type 9150).
– Unseat the card in location 21.
– Switch power on.

Is the card indicator still blinking equally on and off (immediately)?

Yes **No**

012

– Replace the unseated card that is failing in location 21.

013

– Unseat the operator panel adapter card in location 5 from the logic board. See "Operator Panel Adapter Card Removal/Replacement" on page 3-15.
– Switch power on.

Is the indicator still blinking equally on and off (immediately)?

Yes **No**

014

– Replace the unseated operator panel adapter card in location 5.

015

Is there a card in location 24?

Yes **No**

016

– Replace the processor card in location 18.

017

Is the card an Encrypt/Decrypt card (type 9030)?

Yes **No**

018

Replace the processor card in location 18.

019

– Unseat the Encrypt/Decrypt card (type 9030) in location 24.

Warning: Unseating the Encrypt/Decrypt card (type 9030) destroys the Master Key value. See the *3174 Utilities Guide*, GA23-0214.

– Switch power on.

Is the indicator still blinking equally on and off (immediately)?

Yes **No**

020

– Replace the unseated card in location 24.

021

– Replace the processor card in location 18.

022

(From step 006)

Is there a card type 912x in location 21?

Yes **No**

023

In later production controllers, the file adapter and terminal adapter cards are packaged on one card in location 21, type 915x.

Go to Step 031 on page 2-42

024

Is the card indicator on (constant)?

Yes **No**

025

Replace the processor card in location 18.

026

(Step **026** continues)

026 (continued)
- The indicator is not blinking but is on constant. This means ROS is hung.

If a TMA Card (Type 917x) is installed in location 23, it is not necessary to unseat this card.
- Unseat the following logic cards as a group: locations ***17, 19, 20, 22, 23***.
- Switch on power, and verify if the 8888 code has now changed to another code or starts a sequence of code changes.

Is 8888 **displayed?**

Yes **No**

027

In sequence, starting at logic card location 17, reseat the cards that were unseated, one at a time, and then switch power on after you reseat each card.
- Verify if the 8888 code has changed to another code or starts a sequence of code changes.
- Replace the ***reseated*** card that caused the 8888 code to be displayed again.

028
- Within the group you just unseated, reseat the terminal adapter card (type 9150).
- Unseat the card in location 21.
- Switch power on.

Is 8888 **displayed?**

Yes **No**

029
- Replace the unseated card that is failing in location 21.

030
- Replace the processor card in location 18.
- Reseat any unseated cards.

031

(From step 023)
- Unseat the operator panel adapter card in location 5, from the logic board. See "Operator Panel Adapter Card Removal/Replacement" on page 3-15.
- Switch power on.

Is the indicator still blinking equally on and off (immediately)?

Yes **No**

032
- Replace the unseated operator panel adapter card in location 5.

033

Is there a card in location 24?

Yes **No**

034
- Replace the processor card in location 18.
- Replace the File/terminal adapter card in location in 21.

035

Is the card an Encrypt/Decrypt card (type 9030)?

Yes **No**

036

- Replace the processor card in location 18.
- Replace the File/terminal adapter card in location in 21.

037

- Unseat the Encrypt/Decrypt card (type 9030) in location 24.

  Warning: Unseating the Encrypt/Decrypt card (type 9030) destroys the Master Key value. See the *3174 Utilities Guide*, GA23-0214.

- Switch power on.

Is the indicator still blinking equally on and off (immediately)?

Yes **No**

038

- Replace the unseated card in location 24.

039

- Replace the processor card in location 18.
- Replace the File/terminal adapter card in location 21.
- Reseat any unseated logic cards.

040

(From step 008)

Is the card indicator on (constantly)?

Yes **No**

041

Replace the processor card in location 18.

042

- The indicator is not blinking but is on constantly. This means ROS is hung.
- Unseat the following logic cards as a group: locations ***17, 19, 20, 22, 23.***

If a TMA Card (Type 917x) is installed in location 23, it is not necessary to unseat this card.

- Switch on power, and verify if the 8888 code has now changed to another code or starts a sequence of code changes.

Is 8888 **displayed?**

Yes **No**

043

In sequence, starting at logic card location 17, reseat the cards that were unseated, one at a time, and then switch power on after you reseat each card.

- Verify if the 8888 code has changed to another code or starts a sequence of code changes.
- Replace the ***reseated*** card that caused the 8888 code to be displayed again.

044

(Step **044** continues)

044 (continued)
- Replace the processor card in location 18.
- Replace the File/terminal adapter card in location 21.

MAP 0410: File Adapter PIO Bus Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
File adapter P-I/O is failing with status code 103 or 104.	• Logic card (location 18) defective. • Logic card (location 21) defective. • Logic card (location 22) defective.[1] • Logic card (location 23) defective.[1] • Logic card (location 24) defective.[1] [1] When isolating to any one of these three cards, use the minimum configuration procedure at Step 003 in this MAP.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Note: If a TMA card (type 917x) is installed in location 23 or 24, it is not necessary to unseat this card.

– Unseat the following logic cards as a group: locations 22,23,24.

Warning: Unseating card type 9030 (Encrypt/Decrypt) destroys the Master Key value. See the *3174 Utilities Guide*, GA23-0214.

– Switch on power.

Is 103 or 104 still displayed?

Yes **No**

002

– In **sequence**, starting at logic card location 22, reseat the cards that were unseated, one at a time, and then switch on power after you reseat each card.

103 or 104 should be displayed again when you reseat the failing card.

– Replace the failing card.
– Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

003

(Step **003** continues)

003 (continued)
Is 103 **displayed?**
Yes **No**

004

- Replace the processor card in location 18.
- Reseat any unseated logic cards.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

005

- Replace the file adapter card in location 21.
- Replace the processor card in location 18.
- Replace any unseated logic cards.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

MAP 0420: Active System Reset Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The status code is 8888, and the Data Transfer indicator is on.	• Any logic card in locations 10, 5, and 11 through 24 is defective.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached Model (Models 1L and 11L), go offline (indicator on), then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

- Unseat any one card within the group of board ***locations 23, 22, 21,*** and ***17 through 12***.

  Note: If a TMA Card (Type 917x) is installed, it is not necessary to unseat this card.

- Switch power on.

Is the Data Transfer indicator on?

Yes **No**

002

Replace the failing card in the location that is unseated.

003

- Follow the same procedure for the other cards, by unseating any one card at a time. Verify the Data Transfer indicator's condition after each time power is switched on.
- Replace the unseated card that caused the Data Transfer indicator to ***stay off***.

Is the 3174 channel-attached (Models 1L and 11L)?

Yes **No**

004

Go to Step 010 on page 2-48.

005

- Perform the channel **Warning** procedure before unseating the following cards. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.
- Unseat the driver/receiver card (location 10) and the channel adapter card as a group (location 11).
- Switch power on.

(Step **005** continues)

005 (continued)
Is the Data Transfer Indicator off?
Yes **No**

006

- Replace the processor card in location 18.
- Replace the operator panel adapter card in location 5.
- Perform the channel **Warning** procedure again to restore the 3174. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.

007

- Reseat the channel adapter card in location 11.
- Switch power on.

Is the Data Transfer indicator still on?
Yes **No**

008

- Replace the unseated driver/receiver card in location 10.
- Perform the channel **Warning** procedure.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

009

- Replace the channel adapter card in location 11.
- Perform the channel **Warning** procedure.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

010

(From step 004)

- Follow the same one-card-at-a-time unseating procedure for cards 11 and then 24.

  Note: If a TMA card (Type 917x) is installed, it is not necessary to unseat this card.

- Replace the unseated card that caused the Data Transfer indicator to ***stay off***.
- Continue MAP flow if needed.

  Warning: Unseating the Encrypt/Decrypt card in location 24 (type 9030) destroys the Master Key value. See the *3174 Utilities Guide*, GA23-0214.

(Step **010** continues)

010 (continued)
Is the Data Transfer indicator still on?
Yes **No**

011

- Reseat any unseated cards. and resume normal operation.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

012

- Replace the processor card in location 18.
- Replace the operator panel adapter card in location 5.

MAP 0430: File Failures

Symptom Explanation	Conditions That Could Cause This Symptom
File failures-Diskette Drives or Fixed Disk Drives	• Diskette Media failure • Diskette Drives (location 01 or 02) defective. • Fixed Disk Drives (location 03 or 04) defective. • File Adapter Card (location 21) defective. • Processor card (location 18) defective. • Storage card(s) defective.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Is the failing drive a diskette drive? (HG 01 or 02)
Yes **No**

002

- Install the Utility diskette into drive 1 or use the fixed disk if Utility microcode is on the fixed disk.
- Perform a basic test on the failing fixed disk drive (HG03 or HG04). See "Hardware Group Basic Tests" on page 2-115.
- If the test completes with a status code of 20HG, go to Step 008 on page 2-51.
- If the test completes with a status code of 29HG, go to Step 004.
- If the status code is other than 20HG or 29HG, use the *3174 Status Codes* manual for the repair action.

003

- Exchange the diskette in the drive indicated by the HG number.
- Exchange the FRU indicated by TYPE and LOCA, and test again.
- If the failure continues and two diskette drives are present, exchange the other drive with the one just removed in the previous step, and test again.
- Exchange the file adapter in location 21 with the same card type.
- Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-53.

004

(From step 002)
- Remove the Operator Panel and observe the fixed disk drive (HG 03 or 04).
- Feel for any vibrations through the housing to determine if the files are turning.
- When switching power on the 3174, the first fixed drive (HG 03) should start then the second fixed drive (HG 04) should start.

(Step **004** continues)

004 (continued)

Does the file(s) start and continue to turn?

Yes **No**

005

- Check for bent or broken pins on the board socket that the drive is plugged into.
- Check for +12 volts DC at the logic board. See the figure on page 1-49 and Table 1-5 on page 1-49.
- If connections and power are correct, go to Step 007.

006

Note: When the power is switched to ON, the red indicator on the fixed disk will blink one short blink followed by three blinks.

Does the Red indicator on the front of the fixed disk blink as described when the power switch is moved to the "ON" position?

Yes **No**

007

- Replace the fixed disk.
- Perform the Fixed Disk Full Format test (HG 03 or 04, FN 33). See "Fixed Disk Drive Full Format (FN 33)" on page 2-128.

  Warning: This function will erase all previously recorded information from the surface and should be used with extreme caution. The fixed disk will have to be rewritten with all required operational microcode, features, RPQs, configuration data, etc., before this disk can be used again for system operation.

- If the failure continues, exchange the file adapter (location 21) with the same card type and test again.
- If the failure continues, exchange the processor card (location 18) with the same card type.

008

(From step 002)

- Install the Operator Panel.
- Perform the Fixed Disk Defect Fix test. See "Fixed Disk Surface Scan (FN 31)" on page 2-127.

Is 4408 displayed?

Yes **No**

009

- Follow the instructions shown for the other completion code.

  Warning: This function will erase all previously recorded information from the surface and should be used with extreme caution. The fixed disk will have to be rewritten with all required operational microcode, features, RPQs, configuration data, etc., before this disk can be used again for system operation.

- If the failure continues, exchange the processor card (location 18).

010

No new defects were found. You may have an intermittent problem.

- Replace the fixed disk drive. Go to Step 007.

(Step **010** continues)

010 (continued)
- Exchange the file adapter (location 21) with the same card type.
- Exchange the processor card (location 18) with the same type card.
- Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-53.

MAP 0500: Storage Bus Failure

Symptom Explanation	Conditions That Could Cause This Symptom
Status Code 50 to 55. **Note:** The storage bus runs from location 18 (processor card) to locations 19 (1st storage card), location 20 (second storage card), and 17 (third storage card. See Figure 1-7 on page 1-13.	• Logic card location 19 defective. • Logic card location 20 defective. • Logic card location 17 defective. • Logic card location 18 defective. • Logic board is defective.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on) and then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

- Turn the controller power off.
- If present, unseat storage cards in locations 17 and 20.
- Switch the controller power on.

Is the 5x status code displayed?

Yes **No**

002

- One of the cards that was unseated is causing the error. Power off the controller, then reseat one card. Power on and check for the 5x status code. Repeat until the defective card is found.

003

Turn the controller power off and replace the following, one at a time and verify the repair.

- Storage card in location 19
- Processor card in location 18
- If the problem still exists, check the power supply voltages at the logic board. If the voltages are incorrect, replace the power supply.
- If the problem still exists, replace the Logic board.

MAP 0600: MMIO Bus Failure

Symptom Explanation	Conditions That Could Cause This Symptom
Status Code 3002 is caused by a basic MMIO Bus interface problem detected during the testing of any card plugged into locations 11 through 17. See Figure 1-7 on page 1-13. Note that location 17 is a dual-purpose location and could have either a storage card or a feature card installed.	• Defective card in Locations 11 through 17 (or locations 11 through 16 if location 17 is a storage card). • Processor card location 18 is defective. • Logic board is defective.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

- Switch the controller power off.
- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.
- When the 3002 status code is displayed, press Advance until the type and location of the failing card is displayed. Remember this location number.
- Switch the controller power off.
- Unseat all the cards in locations 11 through 17 (11 through 16 if 17 is a storage card).
- Switch the controller power On.
- Perform an Alt 2 IML.

Is 3002 displayed?

Yes **No**

002

- One of the cards that was unseated is causing the error. Power off the controller, then reseat one card. Power on and check for the 3002 status code. Repeat until the defective card is found.

003

Replace the following in the following order.

1. Feature card noted in step 1
2. Processor card in location 18
3. Logic board.

MAP 0610: Token-Ring Network 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or symptom is indicating a Token-Ring Network to 3174 Communication problem.	• Defective Token-Ring adapter card. • Defective Token-Ring communication cable. • Improper customizing responses. • IBM Token-Ring Network.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

002

Use the status code to find the repair action in the *3174 Status Codes* manual.

003

Did the problem occur after the 3174 had been working?

Yes **No**

004

– Use Online Test 2, Option 2, to verify that the customizing response numbers are proper for your Token-Ring attachment. See "Test 2: Configuration Menu" on page 2-175.

If you still have a problem, continue with step 005 in this MAP.

005

– Verify that the 3174 Token-Ring communication cable is plugged into a complete Token-Ring Network configuration.
– To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119.

The following test wraps the data through the normally closed points of the relay in the 8228 multistation access unit and is returned to the 3174 Token-Ring adapter card.

– Key in **3101** and press Enter.

Is 2031 **displayed?**

Yes **No**

006

(Status code = 2931 or 3050). Go to Step 012 on page 2-56.

007

Warning: Only run the wrap test HG(31) Function (02) with the wrap plug installed.

– To completely test the Token-Ring adapter card, a wrap plug (P/N 6165899) is needed.

Do you have the wrap plug?

Yes **No**

008

– Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-53
– Use Online Test 9 to display the Token-Ring adapter test menu. From this menu, you can check the status of the ring, link, or adapter card. See "Test 9: Display the Token-Ring Test Menu" on page 2-199.
– Check for any status code(s) in the event log that pertain to the Token-Ring (HG31), run test 1 event log (option 2). See "Test 1: Display Logs Menu" on page 2-169.

If you find problems with the IBM Token-Ring, see the *IBM Token-Ring Network Problem Determination Guide*.

– Replace the Token-Ring adapter card.

009

– Install the wrap plug into the socket on the Token-Ring card.
– To display the 4001 prompt message, see "How to Load the Test Monitor" on page 2-119. If you ran the tests in the preceding steps, you can obtain the 4001 prompt by pressing Enter.
– Key in **3102** and press Enter.

Is 2031 **displayed?**

Yes **No**

010

(Status code = 2931 or 3050).

– Replace the Token-Ring adapter card.
– Check the wrap plug for bent or broken pins.

011

– Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-53.
– Use Online test 9 to display the Token-Ring adapter test menu. From this menu you can check the status of the ring, link, or adapter card. See "Test 9: Display the Token-Ring Test Menu" on page 2-199.
– Check for any status code(s) in the event log that pertain to the Token-Ring (HG31). Run test 1 event log (option 2). See "Test 1: Display Logs Menu" on page 2-169.
– If you find problems with the IBM Token-Ring Network, see the *IBM Token-Ring Network Problem Determination Guide*, SY27-0280.

012

(From step 006)

– Leave the 3174 Token-Ring cable connected to the adapter card and disconnect the other end of the cable.

The disconnected cable plug shorts the transmit to receive lines, to allow the wrapped data to return to the Token-Ring adapter card.

– Press Enter to obtain the 4001 prompt message.
– To run the cable wrap test, key in **3101** and press Enter.

(Step **012** continues)

012 (continued)

Is 2931 **or** 3050 **displayed?**

Yes **No**

013

Isolate the problem to the 8228 multistation access unit and its cable configuration and connections. See the *IBM Token-Ring Network Problem Determination Guide*.

014

- If you want to isolate the failure to the card or cable, run the wrap test with the wrap plug (P/N 6165899).
- Remove cable at the Token-Ring adapter card and insert the wrap plug.
- Run the wrap test again (3101), note that you may be able to get the 4001 prompt message by only pressing Enter.
- If the wrap test is successful (2031), the communication cable is defective.
- If the wrap test fails (2931 or 3050) replace the Token-Ring adapter card.

MAP 0700: DC Power Indicator Is Off

Symptom Explanation	Conditions That Could Cause This Symptom
The DC or AC Power indicator is off.	• Power was not switched on. • Defective power supply. • Incorrect or missing AC input voltage. • Power sequence from host.[1] • Power Interface Cable.[1] [1] Channel-attached 3174 (Models 1L and 11L) only.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model (Models 1L and 11L), go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

Warning: If the 3174 is a channel-attached model (Models 1L and 11L) and does not have a power interface cable in the power supply plug (J6), power will go off when the switch is changed from Local to Remote.

Note: Another method of removing 3174 input power is to disconnect the power cord at the power supply. The channel-attached Models 1L and 11L does not have a mainline power disconnect switch.

001

– Verify that power is switched on.

Is the 3174 channel-attached (Models 1L and 11L)?

Yes **No**

002

Go to Step 010 on page 2-59.

003

– Go offline. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.
– Set the 3174 Power Control switch to the Local position.
– Switch power on.

Is the DC indicator lit?

Yes **No**

004

Go to Step 010 on page 2-59.

005

This step applies only to channel-attached (Models 1L and 11L).

– Determine if the 3174 power is controlled from the host by checking for the power interface cable from the host to the 3174 power supply plug J6. See Figure 4-7 on page 4-10.

(Step **005** continues)

005 (continued)
Is the power interface cable in socket J6?
Yes **No**

006

The 3174 power can only cycle up in the local mode, and the problem was just fixed by setting the switch to the local position.

007

This step applies only to channel-attached (Models 1L and 11L).
- Verify proper connections at the power interface cable socket J6. See Figure 4-7 on page 4-10.
- Replace the power supply.

  Note: Be sure to use the same type/part number for your replacement.

- Switch off power.
- Set the Power Control switch to the Remote position.
- If the system is available, verify the fix by using the host system to cycle power up at the 3174.

Is remote power up still a problem?
Yes **No**

008

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

009

- Isolate the problem to the host system, and see Figure 1-35 on page 1-51.

010

(From steps 002 and 004)
The AC indicator comes on if the input AC voltage is approximately 50 volts AC. If this is a new installation, you may want to measure the line voltage.
Is the AC indicator on?
Yes **No**

011

- Switch off power.
- Verify that the power cord is inserted into the 3174 power supply receptacle and is also plugged into a working outlet.

  Note: With some power cable configurations, it may be easier to measure input power at the 3174 power cord end.

  Check the 3174 power cable for defects.
- Replace the power supply.

  Warning: Be sure to use the same type/part number for your replacement.

012

Further isolation is required. Go to "MAP 0710: Power Load Isolation" on page 2-60.

MAP 0710: Power Load Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The DC indicator is off because of a power overload condition, or the Power On Reset is being held on.	• Defective power supply. • Defective logic card (locations 11 through 24). • Defective operator panel adapter card (location 5). • Defective diskette drive (locations 1, 2). • Defective fixed disk drive (locations 3, 4). • Defective operator panel (location 6). • Defective fan (locations 42, 43). • Defective driver/receiver card (location 10). • Defective logic board. • Defective I/O board (Models 1L and 11L). **Note:** Use of the card unseating procedure, in this MAP, is suggested for isolating the problem.

DANGER

Line voltages are present within the power supply when the machine is off and the power cord is connected.

(For translations of this safety notice, see Safety Notice 8 in *IBM 3174 Safety Notices*, GA27-3824.)

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translation of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

Note: Another method to remove 3174 input power is to disconnect the power cord at the power supply. The channel-attached Models 1L and 11L does not have a mainline power disconnect switch.

001

The power supply is designed to operate while unseated from the logic board.
- Switch power off.
- Unseat the power supply.
- Switch power on.

Is the DC indicator lit?
Yes **No**

002

Replace the power supply.

Note: Be sure to use the same type/part number for your replacement.

003

- Switch power off.

(Step **003** continues)

003 (continued)
- Reseat the power supply.
- Switch power on.

Is the Data Transfer indicator off?

Yes **No**

004

The system reset is being held active. Go to "MAP 0420: Active System Reset Isolation" on page 2-47.

005

Is the 3174 channel-attached (Models 1L and 11L)?

Yes **No**

006

- Unseat all the logic cards in location (11 through 23).
- Switch power on.
- Go to (ENTRY POINT A) in Step 007 of this MAP.

007

- Unseat all the logic cards in location (12 through 24).
- Switch power on.

(ENTRY POINT A)

Is the DC indicator still off?

Yes **No**

008

- Reseat the cards that were unseated, one at a time, and switch power on after you reseat each card.

The DC indicator should go off again and remain off when you reseat the failing card.

Note: After switching power off, wait at least 2 seconds before switching power on.

009

- Unseat the following components as a group:

  Unseat the diskette drives (locations 1 and 2).
  Carefully unseat the fixed disk drives (locations 3 and 4)
  Unseat the fans (locations 42, 43).

- Switch power on.

Is the DC indicator still off?

Yes **No**

010

- Reseat the components that were unseated in Step 009 of this MAP, one at a time, and switch on power after you reseat each component.

The DC indicator should go off again and remain off when you reseat the failing component.

Note: After switching power off, wait at least 2 seconds before switching power on.

011

- Reseat the fans.
- Remove the operator panel in location 6. See "Operator Panel Removal/Replacement" on page 3-14.
- Switch power on.

Is the DC indicator still off?

Yes **No**

012

Replace the removed operator panel from location 6.

013

- Unseat the operator panel adapter card in location 5 from the logic board.
- Switch power on.

Is the DC indicator still off?

Yes **No**

014

- Replace the unseated operator panel adapter card in location 5.

015

Is the 3174 channel-attached (Models 1L and 11L)?

Yes **No**

016

Go to Step 025 on page 2-63.

017

Channel-attached (Models 1L and 11L) only.

- Before removing the channel cards, perform the channel card **Warning** procedure before unseating the following cards. See the "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.
- Unseat the driver/receiver card (location 10) and the channel adapter card (location 11) as a group.
- Switch power on.

Note: After switching power off, wait at least 2 seconds before switching power on.

Did the DC indicator come on?

Yes **No**

018

Go to Step 022 on page 2-63.

019

- Reseat the card in location 11.
- Switch power on.

The DC indicator should be off again when you reseat the failing card.

Note: After switching power off, wait at least 2 seconds before switching power on.

(Step **019** continues)

019 (continued)
Did the DC indicator remain off?
Yes **No**

020

– Replace the card in location 10.

Note: Use the channel **Warning** procedure again to restore the 3174.

021

– Replace the card in location 11.

Note: Use the channel **Warning** procedure again to restore the 3174.

022

(From step 018)
– Disconnect the local channel I/O board (the card at location 10 is plugged into this board). See **Warning** below. See "Bus/Tag Tailgate Assembly Removal/Replacement (Models 1L and 11L)" on page 3-18.
Is the DC indicator still off?
Yes **No**

023

Replace the I/O board.

Warning: See "How to Disconnect the Bus and Tag Cables" on page 2-288 before replacing the I/O board.

024

Replace the logic board. See "Logic Board Removal/Replacement" on page 3-20.

Warning: If the 3174 is channel-attached (Models 1L and 11L), perform the "How to Disconnect the Bus and Tag Cables" on page 2-288 ***before*** replacing the board.

Note: After replacing the board use the Channel Warning procedure again to restore the 3174.

025

(From step 016)
Is there a card in location 24?
Yes **No**

026

Replace the logic board. See "Logic Board Removal/Replacement" on page 3-20.

027

– Unseat the card in location 24.
– Switch on power.

Note: After switching power off, wait at least 2 seconds before switching power on.

(Step **027** continues)

027 (continued)
Is the DC indicator still off?
Yes **No**

028

Replace the unseated card in location 24.

Warning: Unseating the Encrypt/Decrypt card (Type 9030) destroys the Master Key value. See the *3174 Utilities Guide*, GA23-0214.

029

Replace the logic board. See "Logic Board Removal/Replacement" on page 3-20.

MAP 0800: FRU ID Bus Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Status code 1048. Any card or diskette drive can cause a FRU ID bus failure.	• Defective processor card in location 18. • Any other logic card in locations 5, 10, and 11 through 24 is defective. • Defective diskette drive location 1 or 2. **Note:** Use of the card unseating procedure, in this MAP, is suggested for isolating the problem.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

- Install the Utility diskette into drive 1 or use the fixed disk if Utility microcode is on the fixed disk.
- Visually check the indicator light on the processor card in location 18.

  Note: After a power-on or IML, it takes about 20 seconds for the indicator to start blinking on (long) and off (short).

Is the card blinking?
Yes **No**

002

Replace the processor card in location 18.

003

- Unseat one card with the ***highest*** board location within the group of ***23, 22, 20, 17, 16, 15, 14, 13, 12***.
- Switch power on and wait about 20 seconds to verify the card indicator condition.

Is the indicator blinking?
Yes **No**

004

Replace the failing card in the location that is unseated.

Note: If the new card does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

005

- Follow the same procedure for the other cards in the group (23, 22, 20, 17, 16, 15, 14, 13, 12) by unseating one card at a time in descending order. Again, each time a card is unseated, verify if the indicator ***stops*** blinking after 20 seconds when power is switched on.
- Replace the unseated failing card that ***stops*** the indicator from blinking.

(Step **005** continues)

005 (continued)

Note: If the new card does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

Is the indicator still blinking?

Yes **No**

006

- Reseat any unseated cards.
- Resume normal operation.

007

Is the 3174 a model 3R or 13R?

Yes **No**

008

Go to Step 011.

009

- Unseat the Token-Ring adapter card in location 11 and verify if the indicator stops blinking after 20 seconds when power is switched on.

Note: If the new card does not stop the indicator from blinking then replace the processor card in location 18.

Is the indicator still blinking?

Yes **No**

010

Replace the unseated card in location 11.

Note: If the new card does not stop the indicator from blinking, then replace the processor card in location 18.

011

(From step 008)

Is there a diskette drive in location 2?

Yes **No**

012

Go to (ENTRY POINT A) in step 21 of this MAP.

013

- Unseat diskette drive 2 in location 2.
- Switch power on and wait about 20 seconds.

(Step **013** continues)

013 (continued)

Is the indicator still blinking?

Yes **No**

014

– Replace the failing drive unit that was unseated.

Note: If the new drive unit does not stop the indicator from blinking, then replace the processor card in location 18.

015

– Remove diskette drive 1 from logic board location 01.
– Insert diskette drive 2 into location 01.
– Switch power on and wait about 20 seconds.

Is the indicator still blinking?

Yes **No**

016

– Replace the diskette drive that is not plugged into the board.

Note: If the new diskette drive does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

017

– Unseat the fixed disk drive in location 03.
– Switch power on and wait about 20 seconds.

Is the indicator still blinking?

Yes **No**

018

Replace the failing drive unit that was unseated.

Note: If the new drive unit does not stop the indicator from blinking, then replace the processor card in location 18.

019

– If present, unseat the fixed disk drive in location 04.
– Switch power on and wait about 20 seconds.

Is the indicator still blinking?

Yes **No**

020

Replace the failing drive unit that was unseated.

Note: If the new drive unit does not stop the indicator from blinking, then replace the processor card in location 18.

021

(Step **021** continues)

021 (continued)
(ENTRY POINT A)
Is the 3174 channel-attached (Models 1L and 11L)?
Yes **No**

022

Go to Step 028 on page 2-69.

023

Note: Perform the channel **Warning** procedure before unseating the following cards. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.

- Unseat the driver/receiver card (location 10) and the channel adapter card as a group (location 11).
- Switch on power, and wait about 20 seconds.

Did the indicator stop blinking?
Yes **No**

024

- ***Replace minimum configuration cards/diskette drive.***
- Replace the processor card in location 18.
- Replace the file adapter card in location 21 with the same type.
- Replace the operator panel adapter card in location 5.
- Replace the storage card in location 19.
- Replace the diskette drive in location 1 if diskette drive 2 was ***not*** used as a spare.
- Replace the logic board.

Note: Use the channel **Warning** procedure again to restore the 3174.

025

- Reseat the channel adapter card in location 11.
- Switch power on and wait about 20 seconds.

Is the card indicator still blinking?
Yes **No**

026

Replace the unseated driver/receiver card in location 10.

Note: If the new card does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

Note: Use the channel **Warning** procedure again to restore the 3174.

027

(Step **027** continues)

027 (continued)

- Replace the channel adapter card in location 11.

  Note: If the new card does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

  Note: Use the channel **Warning** procedure again to restore the 3174.

028

(From step 022)

Models 1R, 2R, 3R, 11R, 12R, and 13R only

- Follow a one-card-at-a-time unseating procedure for cards 11 and 24. Replace the card that stops the indicator from blinking.

  Note: If the new card does not ***stop*** the indicator from blinking, then replace the processor card in location 18.

- Continue MAP flow if needed.

  Warning: Unseating the Encrypt/Decrypt card in location 24 (Type 9030) destroys the Master Key. See the *3174 Utilities Guide*, GA23-0214.

Is the indicator still blinking?

Yes **No**

No → **029**

- Reseat any unseated cards.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

Yes → **030**

- Replace the processor card in location 18.
- Replace the file adapter card in location 21.
- Replace the operator panel adapter card in location 5.
- Replace the storage card in location 19.
- Replace the diskette drive in location 1, if diskette drive 2 was ***not*** used as a spare.
- Replace the logic board.

MAP 0900: Channel Problems

001

Scan the following chart sequentially and match your channel failure with one of the symptoms in the chart then take the action specified for that symptom.

SYMPTOM	ACTION
The 3174 fails to go on- or offline	Go to "MAP 0910: Online/Offline Channel Problem (Models 1L and 11L)" on page 2-71.
A channel problem occurs when the 3174 is powered on or off	Go to "MAP 0910: Online/Offline Channel Problem (Models 1L and 11L)" on page 2-71.
All other problems between the host/channel and the 3174	Go to "MAP 0920: Local Channel 3174 Isolation" on page 2-74.

MAP 0910: Online/Offline Channel Problem (Models 1L and 11L)

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translation of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: If the 3174 is a channel-attached model Models 1L and 11L, go offline (indicator on); then set the Power Control switch to the Local position before switching power off. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

001

Scan the following chart and match your failure with one of the symptoms in the chart then take the action specified for that symptom.

SYMPTOM	ACTION
3174 fails to go online (Offline indicator stays on).	Go to Step 002.
3174 fails to go offline (Offline indicator stays off).	Go to Step 004.
A channel problem occurs when the 3174 is powered on or off.	Go to Step 003.

002

(From step 001)
- Verify that the priority switches are set to either high or low priority. See "Priority Switches" on page 4-2.
- To put the 3174 online, a normal IML is required.
- See "How to Place the 3174 Online (Models 1L and 11L Only)" on page 2-287.

Before removing the channel cards, perform the channel card **Warning** procedure or a host problem will occur. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.
- Replace the channel adapter card in location 11.
- Replace the operator panel adapter card in location 5.
- Replace the operator panel in location 6.

  Note: Use the channel card **Warning** procedure again to restore the 3174.

003

(From step 001)
Before removing the channel cards, perform the channel card **Warning** procedure or a host problem will occur. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.
- Replace the driver/receiver card in location 10.
- Replace the power supply.

  Note: Be sure to use the same type/number for your power supply replacement.

- Replace the operator panel adapter card in location 5. Use the channel card **Warning** procedure again to restore the 3174.

004

(From step 001)
(Step **004** continues)

004 (continued)
3174 fails to go offline (Offline indicator stays off).
- Verify the offline procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.
- Verify that the priority switches are set to either high or low priority. See "Priority Switches" on page 4-2.
- Check that the Channel Interface switch is set to Offline.
- Press Alt 1 and momentarily press IML.

Is the Offline indicator on?

Yes **No**

005

- Force the 3174 offline with the power-down method. Set the Power Control switch to the local Position, and switch power off.

Before removing the channel card, perform the channel card **Warning** procedure or a host problem will occur. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.
- Replace the channel adapter card in location 11.
- Replace the operator panel adapter card in location 5.
- Replace the operator panel in location 6.

006

The channel interface or 3174 was probably in a hung state.
- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

007

Use the status code to find the repair action in the *3174 Status Codes* manual.

008

- Press Enter to display the 4001 prompt message.
- Key in **1602** and press Enter.

Is status code 4530 **displayed and is the Offline indicator on?**

Yes **No**

009

- Replace the channel adapter card in location 11.
- Replace the operator panel adapter card in location 5.
- Replace the operator panel in location 6.

010

- Set the Channel Interface switch to Online. Status 4531 should be displayed.

Is the status code 4531 **displayed and the offline indicator off.**

Yes **No**

011

Before removing the channel card, perform the channel card **Warning** procedure or a host problem will occur. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.

(Step **011** continues)

011 (continued)
- Replace the channel adapter card in location 11.
- Replace the operator panel adapter card in location 5.
- Replace the operator panel in location 6.

012

- Change the switch position a few more times, and again verify the results.
- If the hang problem persists, go to "MAP 0920: Local Channel 3174 Isolation" on page 2-74.
- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

MAP 0920: Local Channel 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or a symptom is indicating a host-to-3174 communication problem.	• Defective driver/receiver card in location 10. • Defective channel adapter card in location 11. • High/Low Priority switch not set to High or Low. • Improper customizing option or attachment response number. • Host unit control word (UCW) assignment for 3174 is improper. • Bus and Tag cable block pins or socket pins are bent or broken.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

Warning: Before switching power off, go offline and then set the Power Control switch to the Local position.

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

002

Use the status code to find the repair action in the *3174 Status Codes* manual.

003

Check for any status code(s) in the event log pertaining to the channel adapter (HG16) in At a 3278 or similar display, run the test 1 event log (option 2). See "Test 1: Display Logs Menu" on page 2-169.

Scan the following chart sequentially and match your problem to a symptom in the chart then go to the action for that symptom.

SYMPTOM	ACTION
Host system is indicating a message of channel overrun or lost data.	Check the High/Low Priority switch setting. See "Priority Switches" on page 4-2.
Host or 3174 problem after successful customizing or installation.	Go to Step 004.
Problem after 3174 had been working.	Go to Step 006 on page 2-75.

004

(From step 003)
– Check that the High/Low Priority switch is set to the High or Low position. See "Priority Switches" on page 4-2.
(Step **004** continues)

004 (continued)

- Use Online Test 2, Option 2, to verify that customizing response numbers 100, 101, 104, 105, 224, 225 are proper for your 3174 options and channel attachment. See "Test 2: Configuration Menu" on page 2-175.
- Verify that the proper unit control word (UCW) subchannel assignment for the 3174 has been made in the host. (Consult with the host service representative if necessary.) The 3174 will operate with shared or unshared UCWs and will support disconnect command chaining (DCC). (Block multiplexer channels on some host systems do not support DCC with shared UCWs.) For non-SNA attachment a shared UCW with disconnect command chaining is recommended. For SNA attachment, an unshared UCW is recommended. Several factors, such as other controllers on the channel, availability of UCWs, and priority, should be considered when assigning UCWs. Sometimes a deviation from the above recommendations will degrade system performance. For more information about UCWs, see Chapter 4.

Does the channel to the 3174 still fail?

Yes **No**

005

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.

006

(From steps 003 and 018)

- Check that the High/Low Priority switches are set to the High or Low position. See "Priority Switches" on page 4-2.

Do you have spare cards for locations 10 and 11?

Yes **No**

007

Go to Step 017 on page 2-76.

008

Before removing the channel cards, perform the channel card **Warning** procedure before replacing the following cards. See "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.

- Replace the driver/receiver card in location 10.
- Replace the channel adapter card in location 11.
- Use the channel **Warning** procedure again to restore the 3174.
- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

009

Use the status code to find the repair action in the *3174 Status Codes* manual.

010

- Perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-53). to load the operational code and then go online to verify the repair. See "How to Place the 3174 Online (Models 1L and 11L Only)" on page 2-287.

(Step **010** continues)

010 (continued)
Does the channel to the 3174 still fail?
Yes **No**

011

Return the 3174 to the customer.

012

– To run the driver/receiver wrap test, you will need the following items.

Wrap plug	P/N 56X4829
Wrap plug	P/N 6246339
Terminator	P/N 2282676
Terminator	P/N 2282675

Do you have the wrap and terminator plugs?
Yes **No**

013

– Run OLTs if available in your host system configuration. See the OLTs in Chapter 2 under "3174 Display Subsystem OLTs."

If the problem still exists, use your support structure for aid.

014

(From step 019)
– Perform the driver/receiver wrap test. See "How to Run the Channel Driver/Receiver Wrap Test (FN 01)" on page 2-140.
Is 2016 **displayed?**
Yes **No**

015

– Verify that the Priority switches are set to either High or Low priority.

The wrap test results will show a failing code of 3011 and the associated 'bus in' and 'tag in' signal line(s) that are failing. Inspect the signal line(s) relating to a Bus In or Tag In socket pin(s) for a possible defect. See the "Wrap Test Analysis" on page 2-142.
– Replace the driver/receiver card in location 10.
– Replace the channel adapter card in location 11.
– Replace the I/O board (bus/tag tailgate assembly) only if you are absolutely sure the cards are not defective and the wrap test procedure was properly followed. See "How to Run the Channel Driver/Receiver Wrap Test (FN 01)" on page 2-140.

016

– The path to the Tag Out and Bus Out sockets are not tested with the wrap test. Visually inspect the Tag Out and Bus Out sockets for bent or broken pins.
– Run OLTs if available in your host system configuration. See the OLTs in Chapter 2 under "3174 Display Subsystem OLTs."
– If the problem still exists, use your support structure for aid.

017

(From step 007)
(Step **017** continues)

017 (continued)
To run the driver/receiver wrap test, you will need the following items.

Wrap plug	P/N 56X4829
Wrap plug	P/N 6246339
Terminator	P/N 2282676
Terminator	P/N 2282675

Do you have the wrap and terminator plugs?

Yes **No**

018

- Run OLTs if available in your host system configuration. See the OLTs tests in Chapter 2 under "3174 Display Subsystem OLTs".

Obtain the cards for location 10, 11 or the wrap plugs to isolate the problem. Go to Step 006 on page 2-75.

019

Go to Step 014 on page 2-76.

MAP 1000: ASCII Problem Entry

001

You will need the failure information shown below to be directed to the proper MAP. This information may be obtained from a status code, from the event log Test 1 (Option 2), or from customer reports.

– For the failing port, verify if your status information identifies one item of each of the following steps.

Note: If you have multiple failures, the Port Status Worksheet on page 2-80 may make it easier to compile the status information.

1. Is the failing port(s) connected to a:

- Printer?
- Terminal?
- ASCII Host?

2. Is the failing port(s) attached as a:

- Switched line connection?
- Leased line (nonswitched) connection?
- Direct line connection?

3. Is the failing Port(s) Hardware Group equal to:

- HG = 21, 22, 23, 26?

Is any failing status information shown above (items 1, 2, and 3) *not* known?

Yes **No**

002

Go to Step 007 on page 2-81.

003

– Run the following online tests to obtain failure information and use the worksheet on page 2-80 that shows a summary of the needed information for each port. This worksheet also shows the connection path between a terminal and host. You may want to record the information on another sheet of paper.

The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

– If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find out which key sequence you have to use.
– Log off the current customer application.
– Use one of the following procedures, depending on the type of terminal, to enter test mode:

- 3270 Procedure—At the 3278 (or equivalent) terminal, hold the ALT key down while pressing TEST. Press the ENTER key, then select Test 12 (Asynchronous Emulation Adapter Tests). Go to item 5 below.

- ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a Connection Menu displayed. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

1. At your terminal, switch power off and then on. Press the CR key. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you may bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus shown below (item 2 or 3).

2. Terminal Type Menu—Type in your terminal emulation selection for your terminal type and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).

(Step **003** continues)

003 (continued)

3. Keyboard MAP menu—Key in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection Menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the ESC key and then typing **T**.) Type in **12** and press the CR or ENTER key. After the 3174 test menu appears, type in **12** and press the CR or ENTER key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

   Note: If you are not able to enter test mode, go back to step 1 of this procedure.
5. After the 3174 test menu appears on the screen, select the test(s) by following the menu selections:
   - Select the Asynchronous Emulation Adapter Tests menu, Option 2 (Display Status Summary). Verify the screen results. See "Test 12: Asynchronous Emulation Adapter Tests" on page 2-213.
   - Select the 3174 Test Menu and run Test 3 (Status Summary) for the Host line. Verify that the port(s) having an A on the Host line are ASCII terminals. See "Test 3: 3270 Device Status Information" on page 2-177.
   - Select the 3174 Test Menu and run Test 1, Option 2 (All Events Log) and verify the screen results. Note the Primary and Connection port numbers for a failing port path. See "Test 1: Display Logs Menu" on page 2-169.

– To identify your terminal/device configuration, use the cabling worksheets (located in the door pocket) or the customer's equivalent cabling configuration.

Port Status Worksheet
Asynchronous Emulation Adapter Ports

AEA Ports	HG 21 0 1 2 3 4 5 6 7	HG 22 0 1 2 3 4 5 6 7	HG 23 0 1 2 3 4 5 6 7
Fail/Ports (F)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Terminal (T)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Printer (P)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Host (H)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Switched (S)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Leased (L)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
Fail/Direct (D)	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
3270 Terminal 3A connection to ASCII host	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
ASCII Terminal AA connection to ASCII host	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
ASCII Terminal A3 connection to ASCII host	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _

3270 Terminal/Multiplexed Ports

HG26

3270 Ports	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
3270 Terminal 3A connection to ASCII host	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__

HG26

3270 Ports	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
3270 Terminal 3A connection to ASCII host	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__	__

Figure 2-1. Port Status Worksheet

Were you *not able* to identify any failing port(s)?

Yes **No**

004

Go to Step 007 on page 2-81.

005

- You need to get more information defining the problem from the customer. There could be situations when a failure does not indicate a status code. For example, if a terminal user is not able to communicate with an ASCII host, the problem could be the path to the 3174, and thus the 3174 microcode is not aware of the failing inbound path.
- You will need information from the customer that defines the connectivity inbound and outbound port paths that are failing. Before seeing the customer, **continue** in this MAP.
- The 3270-type terminal or ASCII terminal that is communicating with a 3270 or ASCII host has three connection-path categories that are possible:
  - ASCII terminal to ASCII Host—This path (pass through) uses an AEA port to communicate to a ASCII terminal, and a second AEA port to communicate to the ASCII host.
  - 3270-type terminal to ASCII Host—This 3270 terminal, running ASCII emulation, uses a port on the Terminal Adapter/Multiplexer and a port on the AEA card to communicate with the ASCII host.

- ASCII terminal to 3270 host—This ASCII terminal, running 3270 emulation, only uses a port on the AEA card.

Do you have the connectivity path and the other port information?

Yes **No**

006

Go to Step 007 only when you have the needed information.

007

(From steps 002, 004, and 006)
Use the following chart and select the first symptom that applies to the failure then take the appropriate action.

Note: After a MAP isolates a failure, return here to select the next symptom. You may also need to return here if only part of a connectivity path has been tested. In that case, select the symptom that relates to the other part of the connectivity path not tested yet, and follow that action.

SYMPTOM	ACTION
All ASCII ports are failing.	Go to "MAP 1010: All ASCII Ports Are Failing" on page 2-82.
ASCII Direct attached port(s)—any failing combination.	Go to "MAP 1020: Direct Attached Ports—Any Failure" on page 2-84.
ASCII Leased line (nonswitched) port(s)—any failing combination.	Go to "MAP 1030: Leased Line (non-switched) Port—Any Failure" on page 2-91.
ASCII Switched line port(s)—any failing combination.	Go to "MAP 1040: Switched Line Port—Any Failure" on page 2-98.
3278 terminal type customized to communicate to ASCII Host—Any failing combination.	Go to "MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host" on page 2-112.

MAP 1010: All ASCII Ports Are Failing

Symptom Explanation	Conditions That Could Cause This Symptom
All attached ASCII Terminals/Devices are failing.	• Logic card (location 12) defective. • Logic card (location 13) defective. • Logic card (location 14) defective. • Loose cable connectors. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings. • Open or shorted wires in communication cables.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-56.

Is 2082 **displayed?**

Yes **No**

002

Use the status code to find the repair action in the *3174 Status Codes* manual.

003

Did the problem occur after the 3174 had been working?

Yes **No**

004

Tell the customer to verify the 3174 customizing questions and the known failing device(s) setup parameters for this feature.

– If you still have a problem, continue with step 005 in this MAP.

005

The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

– If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence you have to use.
– Perform a normal IML from a Control diskette or fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-53.
– Use the AEA wrap plug (61X4602) that is shipped with the 3174, remove the cable and ***install the wrap plug*** on the proper I/O panel hardware group (21, 22 or 23) port (0-7).
– To enter test mode at the 3278 (or equivalent) terminal, press and hold the ALT key and press the TEST key. Press the ENTER key. Select Test 12, and then Option 1 (AEA Port Test Menu).
– After the AEA Port Test Menu appears on the screen, key in **2**, **HG**, **PN** where HG = Hardware Group and PN = Port Number. Press the ENTER key. A ready message (READY) or a status code (xxxx) is displayed at the implementing terminal screen.

(Step **005** continues)

005 (continued)
Did the READY message appear on top of the screen?
Yes **No**

006

– Replace the AEA card that corresponds to the failing hardware group. If another AEA card is installed, you could use this card as a substitute.
Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.
If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use this assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

007

– Type in a string of characters. If the test is successful, each character should be displayed on the screen.
Were all the characters displayed as expected?
Yes **No**

008

– Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use this card as a substitute.
Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.
If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use this assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

009

– Remove the wrap plug and reinstall the original cable.

- If this is a new installation, verify that the communication cables are connected to 3174 ports and host/terminal destinations.
- If this is a new installation, verify that the proper communication cable is being used. (Direct cable wiring crosses over to different pins at the host/terminal end). See Figure 2-15 on page 2-149. Switched and Nonswitched cable wiring is the same at each cable end (no crossover of wires). See Figure 2-14 on page 2-148.
- If this is a new installation, return to the 3174 Test Menu, select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). Check that the port is direct, and that the Station line (v p h) agrees with the customizing.
Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.
- Check for communication cable defects.
Switched and Nonswitched cables—The wrap test through the cable can be run if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs. See Figure 2-14 on page 2-148.
Direct cables—To do a wrap test through the cable will require the insertion of the EIA Interface Monitor (breakout box; P/N 453637) at the end of the cable. The breakout box must then be jumpered to match the wrap plug wiring. The cable connector may also require the insertion of the gender connector at the breakout box. See Figure 2-15 on page 2-149.
- Use your support structure for aid.

MAP 1020: Direct Attached Ports—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host through its direct cable path (no modem) to a 3174 port is having a problem.	• Logic card (location 12) defective. • Logic card (location 13) defective. • Logic card (location 14) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective terminal. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings. • Cable problems due to excessive noise.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The external equipment and their attached cables are the responsibility of the customer and are not to be serviced by the on-site Customer Engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

If the problem is with one attached terminal, verify that the customer has performed the terminal manufacturer's checkout test procedures. Also do the same for other terminals if this is a new installation or customizing parameters have been changed.

If the problem is with the direct connection path to an ASCII host, verify that the host system operator was called for the host status condition.

The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.
If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332 to find the correct keying sequence you have to use.

- Log off the current customer application.
- Use the AEA Wrap Plug (61X4602) that is shipped with the 3174 and ***install the wrap plug*** on the proper I/O panel hardware group (21, 22 or 23) connector (0-7)).
- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:

  - 3270 Procedure—At the 3270-type terminal, hold down the ALT key while pressing TEST. Press the ENTER key, select Test 12 (Asynchronous Emulation Adapter Tests), and then Option 1 (AEA Port Test Menu). Go to item 6 below.

  - ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a Connection Menu displayed. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

  1. At your terminal, switch power off and then on. Press the CR key. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you may bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).

2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are running from, and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).
3. Keyboard MAP menu—Key in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection Menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the ESC key and then typing **T.**) Type in **12** and press the CR or ENTER key. After the 3174 Test menu appears, select Test 12 and press the CR or ENTER key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

   Note: If you are not able to enter test mode, go back to item 1 of this procedure.
5. To view messages in the operator information area, press ESC and then press the Shift key and press the ? key.
6. From the AEA Port Tests menu, select Option 2 (AEA Port Wrap) with the port and hardware group information. Press the CR or ENTER key.

Did the READY message appear on top of the screen?

Yes **No**

002

– Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use that card as the replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

003

– Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?

Yes **No**

004

– Replace the AEA card that corresponds to the failing hardware group. If another AEA card is installed, you could use that card as a replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

005

(From step 011)
(Step **005** continues)

005 (continued)

– Return to the AEA Port Tests menu and do the following for the terminal you are using.

  - 3270 type terminal—Perform the ALT and TEST key function two times.
  - ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing ESC, then hold CTL while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

– Remove the wrap plug and reinstall the communication cable.

Is the failing port connected to an ASCII terminal or printer?

Yes **No**

006

(Port is attached to an ASCII host.)

Go to Step 014 on page 2-87.

007

This test allows data to be sent from a terminal to another terminal/printer. The terminal/printer receiving the data must be checked for the correct characters.

The characters are not displayed at the terminal being used to send the data. The tested terminal should be able to enter characters. The same characters should then be displayed at your terminal.

– Run the following default transmit test (Option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.
– Add the port and hardware group information to Option 3 (this will cause the default settings to be used) and press CR or the ENTER key.
– Type in a string of characters and verify the characters are displayed by the other terminal/printer.

Did the other terminal/printer show the proper characters?

Yes **No**

008

Go to Step 021 on page 2-89.

009

- On the terminal at the remote modem end, type in a string of characters. These same characters should then be displayed at your terminal.

Did your terminal show the proper characters?

Yes **No**

010

Go to Step 021 on page 2-89.

011

– If the original customer problem is not repeatable, then you should do the following to check for a noisy communication line. The device may also cause this problem.

  1. Reenter test mode, select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary).

(Step **011** continues)

011 (continued)

2. Check the AEA port for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-24. (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See Step 005 on page 2-85.)
3. Check for any status code(s) in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-169.
4. Determine if this is the problem.

– If the problem is repeatable, and if extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:

- Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes **No**

012

To continue problem isolation, you need the hardware group and port number of the host the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

– Use your support structure for aid.

013

Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

014

(From step 006)

Did the host problem occur after this port had been working?

Yes **No**

015

Tell the customer to verify the 3174 customizing questions and the known failing device(s) setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

If you still have a problem, go to Step 016.

016

(From step 015)

– Use the customer's log or procedure and try to communicate with the host.

Were you able to communicate with the Host?

Yes **No**

017

(From steps 022, 024, and 026)

(Step **017** continues)

017 (continued)

1. Verify that the 3174 communication cable is securely connected at each cable end.
2. If this is a new installation, verify that the communication cable is connected to the proper 3174 port and goes to the proper host destination.
3. If this is a new installation, verify that the proper communication cable is being used. (The cable wiring crosses over to different pins at the host communication end.) See Figure 2-15 on page 2-149.
4. If this is a new installation, return to the 3174 Test Menu. Select Test 12 (Asynchronous Emulation Adapter Tests menu), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.) Check that the port is direct, and the Station line (v p h) agrees with customizing.

   Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.
5. Check for communication cable defects. To do a wrap test through the cable will require the insertion of the EIA Interface Monitor (breakout box; P/N 453637) at the end of the cable. This allows the cable plug to be jumpered to match the wrap plug wiring. The male wrap plug may also require the insertion of a gender conversion connector that would then allow the proper mating of the male wrap plug. The gender conversion connector can be obtained from vendor catalogs.

018

1. Select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the AEA port line for excessive cable errors. These errors are counted by the cable counter. If the cable counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any status code(s) in the event log pertaining to the AEA port (From the 3174 Test Menu, select Test 1, Option 2.) See "Test 1: Display Logs Menu" on page 2-169 and "3174 Event Log" on page 1-24.
4. Determine if this is the problem.
5. Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment parameters for EIA 232D require a cable between 1 meter and 15 meters (3 to 50 feet); the line speed range is from 300-19.2Kbps.

Was the problem isolated?

Yes **No**

019

– Use your support structure for aid.

020

– Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

021

(From steps 008 and 010)
Did the problem occur during customizing or installation?
Yes **No**

022

Go to Step 017 on page 2-87.

023

- You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, stop bits. These four parameters must be correct and must match between the 3174 and the device.

The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.

- Return to the 3174 Test Menu and select Test 2, Option 4 (Asynchronous Emulation Adapter Configuration).
- Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customize Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and match the 3174.

- Display the setup menu, see the manufacturer's documentation or check with the customer.

  Note: The 3174 does not support BLOCK operating mode and only supports 7 data bits as the data word length.

  See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.
- Compare your setup menu settings with the customizing results and update your terminal setup menu, or you can match the parameters when the transmit test is performed in the following step.

Did you find a mismatch between terminal setup and customizing?
Yes **No**

024

Tell the customer to verify the other 3174 customizing questions and the known failing device(s)' other setup parameters for this feature. See the *3174 User's Guide* and verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-87.

025

1. Return to the AEA Port Tests menu.
2. See the following chart and find the W, X, YY, ZZ number that you should enter for these parameters.
3. Add the port, hardware group, and override option parameters, and press the CR or ENTER key. You should then get a READY message.

(Step **025** continues)

025 (continued)

4. Type in a string of characters and verify the characters appear on the receiving device. **Characters will not be displayed at your terminal.**

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19 200 bps	7						

Did the terminal/printer show the proper characters?

Yes **No**

026

Go to Step 017 on page 2-87.

027

Note: The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

– If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

MAP 1030: Leased Line (non-switched) Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host, connected through a leased or nonswitched line to a 3174 port is having a problem.	• Logic card (location 12) defective. • Logic card (location 13) defective. • Logic card (location 14) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective modem. • Defective terminal. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings. • Cable problems due to excessive noise. • Communication line noise. • ASCII Host.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The external equipment and their attached cables, are the responsibility of the customer and are not to be serviced by the on-site Customer Engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

– If the problem is with one attached terminal, verify that the customer has performed the terminal manufacturer's checkout test procedures. Also do the same for other terminals if this is a new installation, or if customizing parameters have been changed.

  If the problem is with the nonswitched connection path to an ASCII host, verify that the host system operator was called for the host status condition.

The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

– If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence you have to use.
– Find a known working terminal.
– Log off the current customer application.

  Use the AEA Wrap Plug (61X4602) that is shipped with the 3174 and ***install the wrap plug*** on the proper I/O panel hardware group (21, 22, 23) port (0-7).
– Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:

  • 3270 Procedure—At the 3278 (or equivalent) terminal, hold down the ALT key while pressing TEST. Press the ENTER key, select Test 12 (Asynchronous Emulation Adapter Tests), and then Option 1 (AEA Port Test Menu). Go to item 6 below.

- ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a Connection Menu displayed. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

1. At your terminal, switch power off and then on. Press the CR key. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you may bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).
2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are running from and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).
3. Keyboard MAP menu—Type in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection Menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the ESC key and then typing **T**.) Type in 12 and press the CR or ENTER key. After the 3174 Test menu appears, select Test 12 and press the CR or ENTER key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

   Note: If you are not able to enter test mode, go back to step 1 of this procedure.
5. To view messages in the operator information area, press ESC and then press the Shift key and press the **?** key.
6. From the AEA Port Tests menu, select Option 2 (AEA Port Wrap) with the port and hardware group information. Press the CR or ENTER key.

A ready message (READY) or an status code (xxxx) is displayed at the implementing terminal screen.
Did the READY message appear on top of the screen?
Yes **No**

002

– Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use that card as a replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

– If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

003

– Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?
Yes **No**

004

– Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use that card as a replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

– If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

005

– Return to the AEA Port Tests menu by doing the following:

  - 3270 terminal type—Perform the ALT and TEST key function two times.
  - ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing ESC, then hold CTL while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

– Remove the wrap plug and reinstall the communication cable.

Is the failing port connected to an AEA terminal or printer?

Yes **No**

006

(Port is attached to an ASCII host.)

Go to Step 014 on page 2-94.

007

This test allows data to be sent from a terminal to another terminal/printer and must be visually inspected at the tested device for the correct characters.

The characters are not shown at the terminal being used to send the data.

– Run the following default transmit test (option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.
– Add the port and hardware group information to option 3 (this will cause the default settings to be used) and press the CR or ENTER key.
– Type in a string of characters and verify the characters are received by the other terminal/printer.

Did the other terminal/printer show the proper characters?

Yes **No**

008

Go to Step 021 on page 2-96.

009

- On the terminal at the remote modem end, type in a string of characters. These same characters should then be displayed at your terminal.

Did your terminal show the proper characters?

Yes **No**

010

Go to Step 021 on page 2-96.

011

– If the original customer problem is not repeatable, you should do the following to check for a noisy communication line. The device may also cause this problem.

  1. Select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)

2. Check the AEA port for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-24.
3. Check for any status code(s) in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-169.
4. Determine if this is the problem.

– If the problem is repeatable, and extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:

- Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes **No**

012

– To continue problem isolation, you need the host connectivity path port number, and the hardware group the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.
– Use your support structure for aid.

013

Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

014

(From step 006)

Did the host problem occur after this port had been working?

Yes **No**

015

– Tell the customer to verify the 3174 customizing questions and the known failing device(s)' setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

If you still have a problem, go to Step 016.

016

(From step 015)

– Use the customer's log or procedure and try to communicate with the host.

Were you able to communicate with the host?

Yes **No**

017

(From steps 022, 024, and 026)

- Verify that the 3174 communication cable is securely connected at each cable end.
- If this is a new installation, verify that the communication cable is connected to the proper 3174 port and goes to the proper destination.

(Step **017** continues)

017 (continued)

- If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals are the same at each cable end.) See Figure 2-14 on page 2-148.
- If this is a new installation, return to the 3174 Test Menu. Select Test 12 (Asynchronous Emulation Adapter Tests menu), then Option 2 (Display Status Summary). (From an ASCII terminal, use the Menu Request sequence as previously done in Step 005.) Check that the port is nonswitched, and that the Station line (v p h) agrees with customizing.

  Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.
- Check for communication cable defects. See Figure 2-14 on page 2-148.

  Note: The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.
- If this is a new installation and a short-haul modem is attached to the 3174, check the unit for any switches that may need to be set (for example, DCE or DTE). The telephone wiring that connects the modems may also be the cause of the problem.
- If the attachment is through a modem, then tell the customer to perform the modem problem determination and to check the phone wiring between the modems. Check the modem switches for proper settings. See "Modem Specifications and Switch Settings" on page 2-292.
- Use your support structure for aid.

018

1. Select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the AEA port line for excessive cable errors. These errors are counted by the cable counter. If the cable counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any status code(s) in the event log pertaining to the AEA port From the 3174 Test Menu, Select Test 1, then Option 2 (All Events Logged). See "Test 1: Display Logs Menu" on page 2-169 and "3174 Event Log" on page 1-24.
4. Determine if this is the problem.

– Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment parameters for EIA 232D require a cable between 1 and 15 meters (3 and 50 feet) and the line speed range from 300 to 19.2Kbps.

Was the problem isolated?

Yes **No**

019

– Use your support structure for aid.

020

– Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

021

(From steps 008 and 010)

Did the problem occur during customizing or installation?

Yes **No**

022

Go to Step 017 on page 2-94.

023

– You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits. These four parameters must be correct and must match between the 3174 and the device.

The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.

– Return to the 3174 Test Menu, select Test 2, then Option 4 (AEA Configuration).
– Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customize Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

– Display the setup menu. See the manufacturer's documentation or check with the customer.

Note: The 3174 does not support BLOCK operating mode and only supports 7 data bits as the data word length.

See Appendix B "Setting Up Your Terminal Switch Settings" in the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

– Compare your setup menu settings with the customizing results and update your terminal setup menu, or you can match the parameters when the transmit test is performed in the following step.

Did you find a mismatch between terminal setup and customizing?

Yes **No**

024

– Tell the customer to verify the other 3174 customizing questions and the known failing device(s)' other setup parameters for this feature. See Appendix B "Setting Up Your Terminal Switch Settings" in the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-94.

025

1. Return to the AEA Port Tests menu.
2. See the following chart and find the W, X, YY, ZZ number that you should enter for these parameters.

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19 200 bps	7						

3. Add the port, hardware group, and override option parameters, and press the CR or ENTER key. You should then get a READY message.
4. Type in a string of characters and characters received by the terminal/printer.

Did the terminal/printer show the proper characters?

Yes **No**

026

Go to Step 017 on page 2-94.

027

On the terminal at the remote end, type in a string of characters. These same characters should then be displayed at your terminal.

– If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

MAP 1040: Switched Line Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host, connected through a switched line to a 3174 port is having a problem.	• Logic card (location 12) defective. • Logic card (location 13) defective. • Logic card (location 14) defective. • Open or shorted wires in communication cable. • Loose connections at the cable connectors. • Defective modem(s). • Defective data phone(s). • Defective terminal. • Incorrect 3174, customizing. • Incorrect terminal/device setup settings. • Communication line noise. • ASCII Host. • Telephone line network.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The attached equipment and cables are the responsibility of the customer and are not to be serviced by the on-site Customer Engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

– Find out from the customer how many users are dialing into this failing port(s) location. Also find out how many are failing. Find out from the host system operator if other equipment and its users are also having problems with this host.

If the host users are only having problems with the 3174 host attachment, continue with this MAP.
The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.
– If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence you have to use.
– Find a known working terminal.
– Log off the current customer application.
– Use the AEA Wrap Plug (61X4602) that is shipped with the 3174 and ***install the wrap plug*** on the proper I/O panel hardware group (21,22 or 23) connector (0-7).
– Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:

- 3270 Procedure—At the 3270-type terminal, hold down the ALT key while pressing TEST. Press the ENTER key, select Test 12, and then Option 1 (AEA Port Tests Menu). Go to item 6 below.
- ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a Connection Menu displayed. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

1. At your terminal, switch power off and then on. Press the CR key. The 3174 should then bring up a connection sequence. Depending on the 3174 customizing, you may bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).

(Step **001** continues)

001 (continued)

2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are using and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).
3. Keyboard MAP menu—Type in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the ESC key and then typing **T**.) Type in **12** and press the CR or ENTER key. After the 3174 Test menu appears, select Test 12 and press the CR or ENTER key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

   Note: If you are not able to enter test mode, go back to item 1 of this procedure.
5. To view messages in the operator information area, press ESC and then press the Shift key and press the ? key.
6. From the AEA Port Tests Menu, select Option 2 (AEA Port Wrap) with the port and hardware group information. Press the CR or ENTER key.

A ready message (READY) or a status code (xxxx) is displayed at the implementing terminal screen.

Did the READY message appear on top of the screen?

Yes **No**

002

- Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use that card as a replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

- If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board, and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

003

- Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?

Yes **No**

004

- Replace the AEA card that corresponds to the failing port and hardware group. If another AEA card is installed, you could use that card as a replacement.

  Note: Use your Hardware Group (HG) number to determine the failing card location (HG 21 = Loc. 14, HG 22 = Loc. 13, HG 23 = Loc. 12). See "Card Plugging" on page 3-3.

- If the wrap still fails, check that the I/O panel cable is properly inserted into the back of the board, and also check for any damaged socket pins. If another panel is installed, you could use that assembly to isolate an internal cable problem. See Figure 3-5 on page 3-12.

005

(Step **005** continues)

005 (continued)

– Return to the AEA Port Tests menu by doing the following for your terminal type.

- 3278 (or equivalent)—Perform the ALT and TEST key function two times.
- ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing ESC, then hold CTL while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

– Remove the wrap plug and reinstall the communication cable.

Is the failing port connected to an ASCII terminal or printer?

Yes **No**

006

(Port is attached to an ASCII host)

Go to Step 030 on page 2-107.

007

The problem could be either the local modem, remote modem, modem cables, phone line, phones, terminal, or the terminal's cable.

The procedures are written for the IBM 5841/2, and Hayes[1] or other modems that support the AT command set. When the attachment is Micom[2] or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation. The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.

Are the modems the IBM 5841/2, Hayes, or similar smart-modems?

Yes **No**

008

– If you do not have a smart-modem, see the manufacturer's documentation for problem isolation.
– If you have a Micom or compatible modem, see the manufacturer's documentation for those MAP steps that require references.

Go to Step 009.

009

(From step 008)

1. You should have the port test menu displayed.
2. Select the Transmit test option (default settings). This selection allows the 3174 to send and receive data from the smart-modem. The AT command and data that follows in this MAP sequence will then initiate a switched-line connection for this.
3. Add the port and hardware group information to Option 3 (default settings) and press the CR or ENTER key.
4. After you get the READY message, type in a string of different characters. The modem should echo the same characters back to your terminal.

(Step **009** continues)

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[1] Trademark of Hayes Microcomputer Products, Inc.

[2] Trademark of Micom Systems, Inc.

009 (continued)
Were the READY message and the proper characters displayed?
Yes **No**

010

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

- Verify that the local modem has power by checking for any lit indicators.
- Verify that the modem's communication cable is securely connected at each cable end.
- Reset the local modem by switching the modem power off and then on.
- If this is a new installation, verify that the communication cable is at the proper 3174 port and goes to the proper smart-modem destination.
- If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals are the same at each cable end.) See Figure 2-14 on page 2-148.
- If this is a new installation, verify that the smart-modem transmission speed agrees with the 3174 customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *3174 Utilities Guide* response numbers 733 and 734, and verify the responses. Select Test 12, Option 2 (Display Status Summary) and check that the attached port is switched, and the Station line (v p h) agrees with customizing. Check that the communication cable goes to the proper destination. From an ASCII terminal, use the Menu Call sequence as before in step 005 to return to the Connection Menu, and then enter test mode.
- Verify that the local modem switch settings are properly set for the attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-292.
- Check for communication cable defects.

  Note: The wrap test through the cable can be run if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.

- If the modem is IBM, you may be able to isolate by running the modem self test. The HAYES modem can only be tested from a working 3174 or a terminal. If modem self-testing is not available, tell the customer that the modem may be defective.

011

The following test requires you to enter the phone number of the remote modem's phone. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, will cause the remote phone/modem to ring and then establish a connection path to the remote terminal. The local modem will then show the DTR, DSR, and CD (IBM), or MR, TR, and CD (HAYES) indicators in the on condition.

– The format for dialing with the AT command is shown in the following table. If additional command information and examples are needed, see the modem documentation.

COMMAND	DESCRIPTION
ATD	Puts smart-modem in dial function mode
T	Tone dialing
P	Pulse dialing
,	If the access code has a number (usually the number 9), then add a comma after the number. This will allow a pause for the second dial tone. Each comma is a pause for 2 seconds.
-	The hyphen can be used to denote breaks between numbers.
;	After dialing, a semicolon allows the modem to go back to command mode. Sometimes other Access information is entered and then the connection can be completed.

- Press the Shift key and type in **ATD**
- Type in the remote modem's phone number after the ATD characters (for example, ATD9,,xxx-xxxx) and press the CR or ENTER key. Within about 45 seconds, your terminal will display either a CONNECT or NO CARRIER message.

Did you get the CONNECT message?

Yes **No**

012

(NO CARRIER or ERROR message)

Note: If a terminal/device is connected to the remote modem, the power must be on the terminal/device for the connection sequence to be successful.

- Reset the local modem by switching power off and then on.
- Retry the connection again; enter the dial sequence as described in the above step.
- You may be able to isolate your connection problem by listening to the modem speaker. The following is the sequence of events at the local modem after you enter the dial sequence.

1. Dial tone.
2. Dialing tones or clicks.
3. Ringing or busy or fast busy. To establish a connection, the remote modem must have DTR, DSR, and CD (IBM), or CD, TR, and MR (HAYES) indicators on. Also check for the correct phone number for the remote modem.
4. Access time for the phone connection.
   - Connection—Wavering tone, then carrier indicator comes on at the local modem.
   - No connection—Operator voice to indicate wrong number or other information. Rings and no answer.

1. Use one or more of the following methods to check your phone communication line:
   - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
   - Use your local modem phone to dial another phone number whereby the other phone can be answered.
   - If a phone is not connected, have someone dial your location and listen for the rings at the local smart-modem speaker.
2. If you are ***not able*** to talk to the other person, hear the rings, or the tone at the modem, then go to step 4 below.

   If you are ***able*** to talk to the other person or hear the rings or the tone at the modem, do only step 3.

3. The problem is most likely the path from your local modem phone line to the remote modem.
   - From another phone, dial your remote modem's number and verify that a tone is heard after the first ring.

– Select from the following the one that applies to your modem:
  - IBM modem—See the 5841/5842 *Guide to Operations*.

    The modem front panel switches can run a data wrap to the remote modem and back to the local modem. Do the "Remote Digital Loop Self Test."
  - Hayes modem—See the manufacturer's documentation.

    The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested by doing a self test from a terminal attached to the remote modem.

4. The problem is most likely from your local modem to the phone line.
   - Verify the phone wire and connections from the modem to telephone data jack.
   - Notify the customer that the modem may be defective.

013

This test allows data to be sent from the requesting terminal to another terminal/printer and must be visually inspected at the tested device for the correct characters. The characters are not shown at your terminal. ***Because of the potential distance of the tested device, it will be necessary to contact another person to verify the test results***. The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.
For this test to be successful, the 3174 customizing response parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.

- Type in a string of characters and verify characters appear at the receiving terminal/printer.

Did the other terminal/printer show the proper characters?
Yes **No**

014

Go to Step 020 on page 2-104.

015

- At the terminal at the remote modem end, type in a string of characters. These same characters should then be displayed at your terminal.

Did your terminal show the proper characters?
Yes **No**

016

Go to Step 020 on page 2-104.

017

– If the original customer problem is not repeatable, then you should do the following to check for a noisy communication line. The device may also cause this problem.

1. Reenter test mode, select Test 12 Option 2. (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)

(Step **017** continues)

017 (continued)

2. Check the AEA port line for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any status code(s) in the event log that pertain to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-169.
4. Determine if this is the problem.

– If the problem is repeatable and if extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:

  • Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes **No**

018

– To continue problem isolation, you need the hardware group and the port number that the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.
– Use your support structure for aid.

019

– Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

020

(From steps 014 and 016)

Did the problem occur during customizing or installation?

Yes **No**

021

Go to Step 027 on page 2-106.

022

The problem could be either 3174 customizing, device setup parameters, a communication cable, or the failing device.

You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits. These four parameters must be correct and must match between the 3174 and the device.

The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.

– Return to the 3174 Test Menu, select Test 2, then Option 4 (AEA Configuration).
– Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customize Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

- Display the setup menu, see the manufacturer's documentation or check with the customer.

  Note: The 3174 does not support BLOCK operating mode and only supports 7 data bits as the data word length.

  See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.
- Compare your setup menu settings with the 3174 customizing results and update your terminal setup menu or you can match the parameters when the transmit test is performed in the following step.

Did you find a mismatch between terminal setup and customizing?

Yes **No**

023

- Tell the customer to verify the other 3174 customizing questions and the known failing device(s)' other setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.
- If customizing is not the problem, go to Step 027 on page 2-106.

024

To do the override option, it is necessary to go back to the AEA Port Tests menu. When returning to the menu, the switched line connection is dropped and the connection sequence must be done again after you enter the proper transmit test parameters.

1. Return to the AEA Port Tests menu.
2. See the following chart and find the W, X, YY, ZZ number that you should enter for these parameters.
3. Add the port, hardware group, and override option parameters, then press the CR or ENTER key. You should then get a READY message.
4. Do the dial connection sequence again by pressing the Shift key and typing in **ATD** and then the phone number information. The proper connection should return with a CONNECT message.
5. Type in a string of characters and check for the same characters to display at the tested device.

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19 200 bps	7						

Did the terminal or printer show the proper characters?

Yes **No**

025

– The smart-modems have a large number of switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup option settings can be checked or changed via the use of the AT commands. The local modem settings can be set from a 3174 terminal. If this 3174 has been newly installed, you need to check the modem options. See "Modem Specifications and Switch Settings" on page 2-292 for the specific parameter recommendations. Also see the manufacturer's documentation for the command parameters.

Go to Step 027.

026

Note: The tested terminal at the remote modem end should be able to enter characters, and these same characters should then be displayed at your terminal.

– If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

027

(From steps 021, 023, and 025)
This modem test takes the incoming transmitted data from the 3174, and the data is read back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is Hayes, disconnect the telephone jack from the local modem or the wall plug.
2. Reset the local modem by switching power off and then on.
3. Return to the AEA Port Tests menu.
4. Add the port and hardware group information to option 3 (default settings). For ASCII terminals, press the CR or ENTER key.
5. When you get the READY message, press the Shift key and type in **ATS16=1**. The modem should then return with the CONNECT or O message.
6. Type in a string of characters. These same characters should be returned from the modem and displayed at your terminal.
7. To terminate the test, type in **ATS16=0** (uppercase characters).

(Step **027** continues)

027 (continued)
Were the proper message and characters displayed at your terminal?
Yes **No**

028

- Reinstall the telephone jack if it was disconnected.
- Tell the customer that the modem may be defective.

029

- From the following, select the one that applies to your modem:
- IBM modem—See the 5841/5842 *Guide to Operations*.
- Hayes modem—See the manufacturer's documentation.

  - The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested from the attached terminal.

- Reset the local modem before returning to the online system.

030

(From step 006)
Did the host problem occur after this port had been working?
Yes **No**

031

- Tell the customer to verify the 3174 customizing questions and the known failing device(s)' setup parameters for this feature.

  Go to Step 032.

032

(From step 031)
The problem could be either the local modem, remote modem, modem cables, phone line, phones, or the 3174 customizing.

The procedures are written for the IBM 5841/2, and Hayes or other modems that support the AT command set. When the attachment is Micom or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation.

The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.
Are the modems the IBM 5841/2, Hayes, or similar smart-modems?
Yes **No**

033

- If you do not have a smart-modem, then see the manufacturer's documentation for problem isolation.
- If you have a Micom or compatible modem, see the manufacturer's documentation when the MAP steps require reference.

  Go to Step 034.

034

(From step 033)
(Step **034** continues)

034 (continued)

- If needed, enter test mode and follow the screen menu selections until the AEA Port Tests menu appears.
- Select Option 3, Transmit Data (Default Options) as shown in the following steps:

1. Add the port and hardware group information to Option 3 (Default Settings) and press the CR or ENTER key (ASCII).
2. After you get the READY message, type in a sequence of different characters. These same characters should echo back to your terminal.

Were the READY message and the proper characters displayed?

Yes **No**

035

The missing READY indicates that the AEA card port did not properly communicate with the attached local modem. When this happens, the IBM modem DTR or the Hayes TR indicator will not come on.

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

1. Verify that the local modem has power by checking for any lit indicators.
2. Verify that the local modem's communication cable is properly connected at each cable end.
3. If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals should be the same at each cable end.) See Figure 2-14 on page 2-148.
4. If this is a new installation, verify that the smart-modem transmission speed agrees with the 3174 customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *3174 Utilities Guide* response numbers 733 and 734, and verify the responses. Select Test 12, Option 2, Display Status Summary, and check that the attached port is switched, and the Station line (v p h) agrees with customizing. Check that the communication cable goes to the proper destination.
5. Verify that the local modem switch settings are properly set for the attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-292.
6. Reset the local modem by switching the modem power off and then on.
7. Check for communication cable defects. See Figure 2-14 on page 2-148.

   Note: The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.
8. If the modem is IBM, you may be able to isolate the problem by running the modem self test. See the modem user's guide. The Hayes modem can only be tested from a working 3174 or a terminal. If modem self-testing is not available, tell the customer that the modem may be defective.
9. Use your support structure for aid.

036

This modem test takes the incoming transmitted data from the 3174 and the data is read back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is Hayes, disconnect the telephone jack from the local modem or the wall plug.
2. Type in **ATS16=1** (uppercase characters), and press the CR or ENTER key (ASCII terminal). After you get the **CONNECT** or **OK** message, type in a sequence of characters. These same characters should be displayed at your terminal.

Were the proper message and characters displayed at your terminal?

Yes **No**

037

- Verify that the local modem switch settings are properly set for attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-292.
- Check for communication cable defects. See Figure 2-14 on page 2-148.

  Note: The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.

- Reinstall the telephone jack if it was disconnected.
- Tell the customer that the local modem may be defective.

038

- Reinstall the telephone jack if it was disconnected.

The following test requires you to enter the phone number of the remote modem's phone. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, will cause the remote phone/modem to ring and then establish a connection path to the remote ASCII host. The local modem will then show the DTR, DSR, and CD (IBM), or MP, TR, and CD (Hayes) indicators in the on condition.

The format for dialing with the AT command is shown below. If additional command information and examples are needed, see the modem documentation.

COMMAND	DESCRIPTION
ATD	Puts smart-modem in dial function mode
T	Tone dialing
P	Pulse dialing
,	If the access code has a number (usually the number 9), then add a comma after the number. This will allow a pause for the second dial tone. Each comma is a pause for 2 seconds.
-	The hyphen can be used to denote breaks between numbers.
;	After dialing, the semicolon allows the modem to go back to command mode. (Sometimes other access information is entered and then the connection can be completed.)

- Press the shift key and type in **ATD**.
- Type in the remote modem's phone number after the ATD characters (for example, ATD9,,xxx-xxxx), and press the CR or ENTER key (ASCII). Within about 45 seconds, your terminal will indicate either a **CONNECT** or **NO CARRIER** message.

Did you get the CONNECT message?

Yes **No**

039

(NO CARRIER message)

- Retry the dial sequence a few times.
- You may be able to isolate your connection problem by listening to the modem speaker. The following is the sequence of events at the local modem speaker.

  1. Dial tone.

(Step **039** continues)

039 (continued)

2. Dialing tones or clicks.
3. Ringing or busy or fast busy. To establish a connection path to the host, the host must be enabled and ready to communicate. The remote modem should have DTR, DSR, and CD (IBM), or CD, TR, and MR (Hayes) indicators on. Verify the correct phone number.
4. Access time for the phone connection.
   - Connection—Wavering tone, then carrier indicator comes on at the local modem.
   - No connection—Operator voice to indicate wrong number or other information. Rings, no answer, and No CARRIER message at your terminal.

   Continue the MAP flow if needed.

1. Use one or more of the following methods to check your phone communication line:
   - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
   - Use your local modem phone to dial another phone number whereby the other phone can be answered.
   - If a phone is not connected, have someone dial your location and listen for the rings at the local smart-modem speaker.
2. If you are ***not able*** to talk to the other person or hear the rings or the tone at the modem, then verify the phone wire and connections from the modem to the wall data jack.

   If you are ***able*** to talk to the other person or hear the rings or the tone at the modem, do only item 3.
3. The problem is most likely the path from your local modem phone line to the remote modem.
   - From another phone, dial your remote modem's number and verify that a tone is heard after the first ring.

– Select from the following the one that applies to your modem:
  - IBM modem—See the 5841/5842 *Guide to Operations*.

    The modem front panel switches can run a data wrap to the remote modem and back to the local modem. Do the Remote Digital Loop Self Test.
  - Hayes modem—See the manufacturer's documentation.

    The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested by doing a self test from a terminal attached to the remote modem.

– Use your support structure for aid.

040

– Use the customer's logon procedure and try to communicate with the host.

Were you able to communicate with the host?

Yes **No**

041

– Verify if other users can establish a connection and communicate with this host.
– If this is a new installation, enter test mode, and from the 3174 Test Menu, select Test 2 (Display Configuration Panels). Verify the customizing responses related to the modem setup option and switch settings.

Modem Setup Option and Switch Settings

The smart-modems have many switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup option settings can be checked or changed via the use of the AT commands. The local modem settings can be set from a 3174 terminal. The remote modem setup options are set from an attached terminal. If this 3174 is newly installed or you need to check the modem options, see "Modem Specifications and Switch Settings" on page 2-292 for the specific switch and parameter recommendations. Also, see the manufacturer's documentation for the command parameters.

– Use your support structure for aid.

042

1. Select Test 12, Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the Status Summary status line for proper results. See Figure 2-52 on page 2-216.
3. Check the AEA port line for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
4. Check for any status code(s) in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-169 and "3174 Event Log" on page 1-24.
5. Determine if this is the customer problem.
6. Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

Cable Information

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment parameters for EIA 232D require a cable between 1 and 15 meters (3 and 50 feet). The Asynchronous Emulation Adapter communication transmission speed range is 300 to 19.2Kbps.

The EIA 232D cable to a modem has a male connector at the 3174 and a male connector at the modem or for a terminal emulating a computer. The cable signal leads are the same at each cable end (no crossover of wires). See Figure 2-14 on page 2-148.

Was the problem isolated?

Yes **No**

043

Use your support structure for aid.

044

– Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-78.

MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host

Symptom Explanation	Conditions That Could Cause This Symptom
3278 (or equivalent) terminal customized to communicate to ASCII Host - Any failing combination.	• Logic card (location 12) defective. • Logic card (location 13) defective. • Logic card (location 14) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective terminal. • Incorrect 3174 customizing. • Cable problems due to excessive noise.

CAUTION:
To avoid the possibility of electrical shock, switch off power and disconnect power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive.
(For translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

– Before using this MAP, you must verify the following by getting the information from the customer or by running Test 12 and Test 3 (Display Status Summary). See "MAP 1000: ASCII Problem Entry" on page 2-78 and use the procedure in Step 003, then return here.

- Verify if only 3278-type terminals are having a problem with the ASCII host.
- Verify if this AEA feature configuration also includes attached ASCII terminals.
- Verify if the ASCII terminal(s) are also having a problem with the ASCII host.

Is the AEA feature configured to include both ASCII and 3278-type terminals?
Yes **No**

002

- ASCII only—You are in the wrong MAP. Go back to the Symptom/Action chart in MAP 1000.
- 3270 only—If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate the 3278-type terminal problem.
- 3270 only—Go back to the Symptom/Action chart in MAP 1000. Select the proper ASCII port attachment symptom and use the MAP to isolate the ASCII host problem.

003

(Step **003** continues)

003 (continued)
Is the problem only with 3278-type terminal(s)?
Yes **No**

004

- Go back to the Symptom/Action chart and select the ASCII symptom to isolate the problem.

005

- If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate 3278-type terminal problems.
- If a terminal does not get the ASCII Connection Menu, the problem is most likely due to improper 3174 customizing.
- Use your support structure for aid.

Diagnostic Aids: Offline Tests

Offline tests are started from the 3174 operator panel and then controlled either from the operator panel or from the terminal connected to port 0. The terminal must be a 3278 or equivalent. The test monitor program (HG 80) is on the Utility diskette, which should be inserted into diskette drive 1. A copy of the Utility diskette can also be on a fixed disk (HG 03 or 04). Offline tests consist of three major types:

- Hardware Group Test Alls and Processor and storage tests (HG = 81, 82, 87)
- Hardware Group Basic Tests (HG = 01−52)
- Hardware Group Optional Tests (HG = 01, 02, 03, 04, 08, 09, 11, 16, 21, 22, 23, 26, 51, 52, 31, 80).

Hardware Group Test Alls and Processor/Storage Tests

Hardware Group Test Alls are invoked by entering hardware group numbers 81, 82, or 87 at the Alt 1 IML 40 prompt or the test monitor 4001 prompt message. An optional test parameter can also be entered with the hardware group number that causes the selected test to loop, stop on error, or both. If an error occurs during these tests, it is saved in a test error log in machine storage unless it is a critical error, such as a machine check. If a critical error occurs, the test halts and a status code is displayed. If HG 81, 82, or 87 are looped, errors that occur are written to the Utility diskette at the end of each test run. These errors are displayed by use of the test monitor program (HG 80). If an error occurs that halts the test run, the error can be bypassed by use of the *continue* function (key in **1**; press Enter). The test continues with the next hardware group in the test runlist. The test runlist varies, depending on which Test All hardware group was selected, and which hardware groups are installed in the controller under test. The chart below is an example of the order tests would run on 3174 Models 1R and 11R with two diskette drives, a Type 1 communication adapter, and a terminal adapter installed.

Table 2-1. Test Sequence for Models 1R and 11R

Test All 81	**Test All 82 or Alt 2 IML**	**Test All 87**
2X87	2X87	2X87
2X01	2X01	
2X02	2X02	
2X08	2X08	
2X11 (with wrap test)	2X11 (without wrap test)	
2X26 (with wrap test)	2X26 (without wrap test)	

Test All 81 (CSU)

Hardware Group 81 verifies that the hardware in the controller is working correctly at customer setup (CSU) time. The following tests are performed by HG 81:

- Processor and storage
- Diskette drives 1 and 2
- Fixed disk drives 1 and 2
- All installed adapters
- Port wraps on the terminal adapter
- Communication adapter cable wrap test.

This test should be performed only at customer setup, because of special requirements for successful completion of the test. The special requirements are as follows:

- All external terminal cables must be disconnected from the Terminal Multiplexer Adapter (TMA) cards and the Terminal Adapter in the controller, except for the cable connected to logical port 0. Do not disconnect the coaxial cables that connect the TMAs to the terminal adapter.
- For models with a Communication Adapter present, the communication interface cable must be attached to the Communication Adapter and the Test/Oper switch on the cable must be set to the Test position.

  Note: V.35 interface cables have special requirements for running the CSU tests. For details, see "V.35 Cable Wrap Test (Three Test/Oper Switches)" on page 2-136 and "V.35 Cable Wrap Test (One Test/Oper Switch)" on page 2-136.
- If two diskette drives are present in the controller, the Utility diskette must be in diskette drive 1 and a Control diskette must be in diskette drive 2.
- For models with a Token-Ring adapter present, the Token-Ring adapter cable must be connected to the adapter card.

Test All 82 (Alt 2 IML)

Test 82 is normally used after the controller has been installed and a failure has occurred. The following tests are performed by HG82.

- Processor and storage
- Diskette drives and fixed disk drives
- All installed adapters.

Test 82 does not run any wrap tests, so there are no requirements for setting test switches. If Test 82 runs successfully, 2082 appears in the status display.

Test All 87

Hardware group 87 is normally used after the controller has been installed and a failure occurs. The following tests are performed by HG87.

- Processor
- Storage.

Hardware group 87 does not run any wrap tests, so there is no requirement for setting test switches. If hardware group 87 runs successfully, 2087 appears in the status display.

Hardware Group Basic Tests

Hardware Group Basic Tests are invoked by entering a hardware group number 01 – 52 at the test monitor 4001 prompt message. These tests can be looped by use of an optional test parameter. Hardware Group Basic Tests (01-52) are run on individual adapters, such as the file adapter or the terminal adapter. These tests are the same tests that are run when an Alt 2 IML is performed, or when HG 82 is run. The difference is that only one specific FRU group is being tested. If an error occurs during a hardware group basic test, the test halts and a status code is displayed. Tests can be terminated by use of the *free* function (press Enter). The 4001 prompt message is displayed, and another test request can be entered.

Hardware Group Optional Tests

Hardware Group Optional Tests are invoked by entering a hardware group number (01, 02, 03, 04, 08, 09, 11, 16, 21, 22, 23, 26, 31, 51, 52 or 80) and a function number and/or a function parameter. These tests can be looped by entering an optional test parameter in front of the function number. They provide special test capabilities, such as communication cable wraps and port wraps. Hardware Group Optional Tests can be selected for the following:

- Diskette drives
- Fixed disk drives
- Timer
- Operator panel
- Communication Adapter
- Concurrent Communication Adapter
- Channel Adapter
- Asynchronous Emulation Adapter
- Terminal Adapter
- Terminal Multiplexer Adapter/3299
- Token-Ring Adapter
- Test monitor (see the note below).

Note: The test monitor (HG 80) provides a special set of optional tests for displaying logs and the controller hardware configuration.

Test Request Format

Table 2-2 lists all the test requests that can be entered. Test requests that start with hardware group numbers 01-52 can be entered only at the test monitor 4001 prompt message. Test requests that start with hardware group numbers 80, 81, 82, and 87 can be entered at either the Alt 1 IML 40 prompt or the test monitor 4001 prompt. Hardware groups 81, 82, and 87 are normally entered at the 40 prompt, because these hardware groups load the test monitor program and start a test runlist. The hardware group number is the only required field in a test request entry. The test parameter, function number, and function parameter numbers are optional fields.

The test request format is: HG TP FN FP

Where:

HG = Hardware group number (see Table 2-2)
TP = Test parameter (optional) (see Table 2-3 on page 2-119)
FN = Function number (optional) (see Table 2-2)
FP = Function parameter (optional) (see Table 2-2).

Table 2-2 (Page 1 of 2). Function Numbers and Function Parameters

HG	TP	FN	Description	FP	FP Description	Page
01	90–97		Diskette 1			2-123
01	90–97	01	Diskette 1 Ready Test			2-125
01	90–97	02	Diskette 1 Media Surface Test			2-126
02	90–97		Diskette 2			2-123
02	90–97	01	Diskette 2 Ready Test			2-125
02	90–97	02	Diskette 2 Media Surface Test			2-126
03	90–97		Fixed Disk 1			2-123
03	90–97	31	Fixed Disk 1 Surface Scan			2-127
03	90–97	32	Fixed Disk 1 Defect Fix			2-128
03	90–97	33	Fixed Disk 1 Full Format			2-128
03	90–97	34	Display Fixed Disk 1 Defect Table			2-130
03	90–97	51	CSU Surface Scan			
04	90–97		Fixed Disk 2			2-123
04	90–97	31	Fixed Disk 2 Surface Scan			2-127
04	90–97	32	Fixed Disk 2 Defect Fix			2-128
04	90–97	33	Fixed Disk 2 Full Format			2-128
04	90–97	34	Display Fixed Disk 2 Defect Table			2-130
04	90–97	51	CSU Surface Scan			
08	90–97		Timer			2-123
08	90–97	01	Read Timer			2-132
08	90–97	02	Set Timer			2-132
09	90–97		Operator Panel			2-133
11	90–97		Communication Adapter			2-123
11	90–97	01	Interface Wrap Test			2-135
11	90–97	02	Modem Wrap (external clock)			2-135
11	90–97	04	Modem CD/DSR Status (EIA/V.35)			2-135
11	90–97	05	X.21 Wrap (external clock)			2-135
11	90–97	07	Type 1 Driver Static Test (NTT Japan)			2-136
16	90–97		Channel Adapter			2-123
16	90–97	01	Driver/Receiver Wrap Test			2-140
16	90–97	02	Channel Adapter Switch/Indicator Test			2-146 2-136
21	90–97		Asynchronous Emulation Adapter			2-123
21	90–97	01	Driver/Receiver Wrap Test	00–07	Logical Port Number	2-147
22	90–97		Asynchronous Emulation Adapter			2-123
22	90–97	01	Driver/Receiver Wrap Test	00–07	Logical Port Number	2-147

Table 2-2 (Page 2 of 2). Function Numbers and Function Parameters

HG	TP	FN	Description	FP	FP Description	Page
23	90–97		Asynchronous Emulation Adapter			2-123
23	90–97	01	Driver/Receiver Wrap Test	00–07	Logical Port Number	2-147
26	90–97		Terminal Adapter			2-123
26	90–97	01	Terminal Adapter Port Wrap	00, 08, 16, 24	Terminal Adapter Port Number	2-153
26	90–97	02	Term Mpx/3299-2, 3 Port Wrap	00–31	Logical Port Number	2-153
26	90–97	03	Terminal Path Test	00–31	Logical Port Number	2-153
26	90–97	04	CUT Display Exerciser	00–31	Logical Port Number	2-153
26	90–97	05	Terminal Adapter Wrap All			2-153
26	90–97	06	Terminal Mpx/3299-2, 3 Wrap All	00, 08, 16, 24	Terminal Adapter Port Number	2-154
26	90–97	07	Printer Exerciser Test	00–31	Logical Port Number	2-154
31	90–97		Token-Ring adapter			2-123
31	90–97	01	Cable Wrap Test			2-156
31	90–97	02	Adapter Wrap Test			2-156
31	90–97	10	Display Universal Address			2-156
46	90–97		Encrypt/Decrypt			
51	90–97		CCA			2-123
51	90–97	01	Interface Wrap Test			2-135
51	90–97	02	Modem Wrap (external clock)			2-135
51	90–97	04	Modem CD/DSR status (EIA/V.35)			2-135
51	90–97	05	X.21 Wrap Test Type 1 Driver			2-135
51	90–97	07	Static Test (NTT Japan)			2-136
52	90–97		CCA			2-123
52	90–97	01	Interface Wrap Test			2-135
52	90–97	02	Modem Wrap (external clock)			2-135
52	90–97	04	Modem CD/DSR status (EIA/V.35)			2-135
52	90–97	05	X.21 Wrap Test Type 1 Driver			2-135
52	90–97	07	Static Test (NTT Japan)			2-136
2-123						
80		01	Display Test Log			2-159
80		02	Display Test Log – IML Drive			2-161
80		03	Reset Test Log – IML Drive			2-161
80		04	Display Hardware Configuration			2-162
80		05	Display FRU ID Table			2-162
80		06	Display Test Log Count/Time			2-159
80		07	Display Test Log Count/Time IML Drive			2-162
81	90–97		Test All (CSU Mode)			2-123
82	90–97		Test All (Installed Mode)			2-123

Test Parameters

Test parameters, defined in Table 2-3, are used to qualify a test request.

Table 2-3. Test Parameters

TP	Description	TP	Description
90	No Options - Default	94	Terminal Control
91	Loop	95	Loop, Terminal Control
92	Stop on Error	96	Stop on error, Terminal Control
93	Loop, Stop on Error	97	Loop, Stop on Error, Terminal Control

Loop

Loop is used to loop any valid hardware group test request. This parameter is ignored for hardware group 80. This parameter is reset at the end of the test and must be reentered with each test request. To stop a test that is looping, press Enter.

Terminal Control

This parameter requests the test control program to switch control of the tests from the operator panel to the terminal connected to port 0. The terminal must be a 3278 or equivalent. Once control is at the terminal, it remains until another IML is performed. It is not necessary to specify terminal control with each test request. Also, an entry of test parameter 90 will not reset terminal control.

Stop on Error

Stop on Error is applicable when HG 81, 82, or 87 has been selected or when looping is specified on an individual hardware group. This parameter is ignored for HG 80. When this parameter is specified, the test control program halts and each error is displayed as it occurs. A *continue* function can be used to allow the test request to proceed. When running HG 81, 82, or 87 with stop on error off, the test control program collects each error in a log without halting and presents all the errors at the end of the test.

How to Load the Test Monitor

The Test Monitor is a part of the Utility microcode. The Utility microcode is contained either on a diskette or on a fixed disk. If you are using diskettes, see "Loading the Test Monitor from a Diskette." If you are using a fixed disk, see "Loading the Test Monitor from a Fixed Disk" on page 2-120.

Loading the Test Monitor from a Diskette

1. Insert the Utility diskette into diskette drive 1.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. 40 is displayed. (You may display the Master Menu on the terminal connected to port 0 by pressing Enter. See Figure 2-90 on page 2-285.)

For operator panel control

a. Key in **80**
b. Press Enter.
c. 4001 is displayed.

For terminal control

a. Key in **8094**
b. Press Enter.
c. Go to the terminal connected to port 0.
d. 4001 is displayed.

Loading the Test Monitor from a Fixed Disk

1. Press and hold Alt 1.
2. Press and release IML.
3. Release Alt 1.
4. 40 is displayed.

For operator panel control

a. Key in **0380** or **0480** where:
   03 = Fixed disk 1
   04 = Fixed disk 2
   80 = Load test monitor.
b. Press Enter.
c. 4001 is displayed.

For terminal control

a. Key in **0380** or **0480** where:
   03 = Fixed disk 1
   04 = Fixed disk 2
   80 = Load test monitor.
b. Press Advance.
c. Key in **94**
d. Press Enter.
e. Go to the terminal connected to port 0.
f. 4001 is displayed.

Terminal Control Test Menus

Terminal control of offline tests is performed on a 3278 or similar terminal connected to port 0 of the controller. Once terminal control is established, a test request can be entered on the Select line of each menu. Depending on the hardware group being tested, two or three menus are displayed. To determine what test input should be entered, see the run procedure for the desired test. There are two methods for entering a test request on the test menus.

Method 1

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Type in the HG number on the Select line of the Test Menu.
3. Press PF8 or if no other options, go to step 7.
4. Type in the TP number on the Select line of the Test Parameters Menu.
5. Press PF8 or if no other options, go to step 7.
6. Type in the FN number and the FP number on the Select line of the Selectable Functions Menu. See Table 2-2 on page 2-117.
7. Press ENTER.

Method 2

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Type in the entire test request (HG TP FN FP) on the Select line of the Test Menu. See Table 2-2 on page 2-117.
3. Press ENTER.

If Method 1 is used, the three menus are displayed. These are the menus that appear if the controller under test has the hardware groups installed as shown on the Test Menu and HG 26 is the hardware group to be tested:

- Test Menu – Displays the hardware groups that are installed (see Figure 2-2).
- Test Parameters Menu – Displays optional test parameters (see Figure 2-3).
- Selectable Functions Menu – Displays function numbers and function parameters (see Figure 2-4).

Depending on the hardware group that was selected from the first menu, different function numbers and function parameters are displayed on the Selectable Functions Menu. Some hardware groups do not have the third menu, because there are no assigned function numbers or function parameters.

```
                Diagnostic Test Menu

TYPE HG: Press PF8

HG        Description              HG        Description

01        Diskette 1 - 1.2MB       09        Operators Panel
02        Diskette 2 - 1.2MB       16        Channel Adpt
03        Fixed Disk 1 - 20MB      26        Terminal Adpt
04        Fixed Disk 2 - 20MB      31        Token Ring - 4MB
08        Timer
                                   80        Test Monitor Functions
                                   81        Test All - Setup Mode
                                   82        Test All - Installed Mode


Select ===>_
4001

PF:3=Master Menu   8=Fwd
```

Figure 2-2. Test Menu

```
                    _____ Test Parameters _____

TYPE TP: Press PF8

TP        Description

90        No Options - Default
91        Loop Request
92        Stop on Error
93        Loop and Stop on Error



Select ===> HG _
4001


PF:7=Back     8=Fwd
```

Figure 2-3. Test Parameters Menu

```
                    _____ Selectable Functions _____

Terminal Adapter

FN  Description                       FP  Description

01  Terminal Adapter Port Wrap        PT  Terminal Adpt Port 00, 08, 16, 24
02  Term Mpx Adpt/3299-2, 3 Port Wrap PT  Logical Port 00-31
03  Terminal Path Test                PT  Logical Port 00-31
04  CUT Display Exerciser             PT  Logical Port 00-31
05  Terminal Adapter Wrap All         NR  Not Required
06  Term Mpx Adpt/3299 Wrap All       PT  Base Port 00, 08, 16, 24
07  Printer Exerciser                 PT  Logical Port 00-31

Function requirements
  FN 01,02,05,06 - To insure a valid wrap, the cable(s) must be
                   disconnected from wrapped port(s).

Select ===> HG TP _

PF:7=Back
```

Figure 2-4. Selectable Functions Menu

How to Run Hardware Group Test Alls or Processor/Storage Test

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001:

   For operator panel control

   a. Key in **81**, **82**, or **87**
   b. Press Enter.

   For terminal control

   a. Key in **8194**, **8294**, or **8794** and press ENTER.
   b. Go to the terminal connected to port 0.
   c. The selected test is in progress.

   Note: The processor/storage tests (HG 87) cannot be selected under terminal control. Processor/storage can be selected only from the operator panel.

How to Run Hardware Group Basic Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001, key in **HG TP**
   Where: HG = Hardware group (see Table 2-4 on page 2-124).
   TP = Test parameter (optional) (see Table 2-5 on page 2-124).
3. Press ENTER; test execution begins.
4. One of the following status codes is displayed, where HG equals the hardware group being tested:
   21HG = Test in progress
   22HG = Test in progress
   20HG = Test completed
   29HG = Test failure
   For all other status codes, see the *3174 Status Codes* manual.
5. To make another selection at 20XX, press ENTER; 4001 is displayed.

These examples assume the test monitor has been loaded.

To run a Terminal Adapter Card Test:
At 4001, key in **26** and press ENTER.

To loop a Terminal Adapter Card Test:
At 4001, key in **2691** and press ENTER.

To run CSU tests:
At 4001, key in **81** and press ENTER.

To run CSU Tests/Terminal Control:
At 4001, key in **8194** and press ENTER.

Note: Only HGs 81, 82, and 87 can be selected at the Alt 1 IML 40 prompt. For all other hardware groups, an **80** must be entered first to obtain the 4001 prompt, as shown in the examples.

Table 2-4. Hardware Group Numbers (Basic Tests)

HG	Unit	HG	Unit
01	Diskette 1/File adapter	16	Channel Driver/Receiver
02	Diskette 2	21	Asynchronous Emulation Adapter
03	Fixed Disk 1	22	Asynchronous Emulation Adapter
04	Fixed Disk 2	23	Asynchronous Emulation Adapter
08	Timer	26	Terminal Adapter
09	Operator Panel	26	Terminal Multiplexer Adapters
11	Communication Adapter	31	Token-Ring adapter
16	Channel Adapter	46	Encrypt/Decrypt Adapter
		51,52	Concurrent Communication Adapter

Table 2-5. Test Parameters (Basic Tests)

TP	Description	TP	Description
90	No Options - Default	94	Terminal Control
91	Loop	95	Loop, Terminal Control
92	Stop on Error	96	Stop on error, Terminal Control
93	Loop, Stop on Error	97	Loop, Stop on Error, Terminal Control

Loop

Loop is used to loop any valid hardware group test request. This parameter is ignored for the 80 test request. This parameter is reset at the end of the test and must be reentered with each test request. If errors occur while a test is running, they are stored in the test error log. When this log is full, the test will stop. To stop a test that is looping, press ENTER. Certain tests may require an IML or pressing ENTER at the operator panel to stop the test from looping.

Terminal Control

This parameter requests the test control program to switch control of the tests from the operator panel to the terminal connected to port 0. A 3278 or equivalent terminal is required. Once control is at the terminal, it remains until another IML is performed. It is not necessary to specify terminal control with each test request. An entry of test parameter 90 will not reset terminal control.

Stop on Error

Stop on Error is applicable when HG 81, 82, or 87 has been selected, or when looping is specified on an individual hardware group. This parameter is ignored for HG 80. When this parameter is specified, the test control program halts and each error is displayed as it occurs. A *continue* function (type in **1**, press ENTER) can be used to allow the test request to proceed. When running HG 81, 82, or 87 with stop on error off, the test control program collects each error in a log without halting and presents all the errors at the end of the test.

How to Run Diskette Drive Optional Tests

Two diskette drive optional tests can be performed on the 3174.

Function number 01 is the diskette drive ready test. This test verifies that the diskette drive ready circuitry and the diskette change function are working correctly.

Function number 02 is the diskette media surface analysis test. This test is used to check for defective tracks and sectors on a diskette.

It is recommended that these tests be performed at the controller because manual intervention is required to complete these tests successfully.

Diskette Drive Ready Test (FN 01)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG01**

   Where:

   HG = 01 (to test diskette drive 1)
   HG = 02 (to test diskette drive 2)
   01 = Function number 01
3. Press ENTER, the test begins.
4. 4561 or 4563 is displayed.
5. Open the diskette drive door; 4560 is displayed.
6. Close the diskette drive door; 4561 is displayed.
7. Open the diskette drive door and remove the diskette; 4562 is displayed.
8. Insert the diskette and close the diskette drive door; 4563 is displayed.
9. Repeat steps 5 through 8 as many times as required to verify that the diskette drive is working correctly.

   Note: If the status code does not change after performing an action with the diskette drive, the diskette drive or the file adapter is defective.
10. To select other tests, press ENTER; 4001 is displayed.

Diskette Drive Media Surface Test (FN 02)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001, key in HG02

   Where:
   HG = 01 (to scan a diskette in drive 1)
   HG = 02 (to scan a diskette in drive 2)
   02 = Function number 02
3. Insert the diskette to be scanned into the selected diskette drive. If the Utility diskette in diskette drive 1 is being scanned, skip this step and go to step 6.
4. Press ENTER.
5. At 4565, key in **1** and press Enter.
6. One of the following codes is displayed in the status indicators,
   where:
   HG equals the diskette drive selected as the test drive:

   21HG = Test in progress
   22HG = Test in progress
   4566 = Test completed (no defects found)
   4567 = Test completed (defects found).
7. If 4567 is displayed, press Advance and record the additional data. See status code 4567 in the *3174 Status Codes* manual.
8. To continue testing at 4xxx, press ENTER 4001 is displayed.

How to Run Fixed Disk Drive Optional Tests

It is recommended that you run the fixed disk optional tests from a terminal. The panels displayed give the same information as the operator panel, but the information is much easier to read from the display. See "How to Load the Test Monitor" on page 2-119. **Warning:** Do not power off the 3174 until the selected function comes to a normal completion. Surface defects could occur with lost data if powered off during operation.

Five fixed disk drive optional tests can be performed on the 3174.

Function number 31 is the Fixed Disk Surface Scan test. This function verifies that no damage has occurred to the media (especially after a physical relocation of a 3174).

Function number 32, Fixed Disk Defect Fix, requires a completed surface scan as input. If the surface defect fix is invoked but surface scan has not been executed, the surface scan will be invoked automatically. This function is used to assign alternate sectors/tracks for those found defective by the surface scan test. Recoverable data will be transferred to an alternate sector/track.

Function number 33, Fixed Disk Full Format, erases the disk and maps around any defects on the disk. After the test has been run, 3174 microcode must be copied onto the fixed disk. This is accomplished by using the Media Management Utility described in the *3174 Utilities Guide*.

Function number 34 causes the Fixed Disk Scan Defect table to be displayed. Function 34 requires Function 31 to be run first.

Function number 51 is called automatically during a "Test All - CSU mode" when a new 3174 is installed. It can also be used in testing a new fixed disk feature. This test checks for several files in the system area that may not be present on a new fixed disk drive. If these files are not found, they are added to the system area. If the files are present, this function just does a surface scan. Customer data that is on the disk will not be affected.

Fixed Disk Surface Scan (FN 31)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG31**

   Where:
   HG = 03 (to scan fixed disk 1)
   HG = 04 (to scan fixed disk 2)
   31 = Function number 31
3. Press ENTER.
4. One of the following codes is displayed:

   23xx = Surface Scan Test in progress (xx = a number that decrements to 0).
   4401 = SCAN complete; No new defects found.
   4402 = SCAN complete; DEFECT FIX recommended.
   4403 = SCAN complete; DEFECT FIX required.
   4404 = SCAN complete; Full FORMAT required.
5. If the test does not come to a normal completion, press Advance and record the additional data. See the status codes in the *3174 Status Codes* manual.
6. To continue testing at 4xxx, press ENTER; 4001 is displayed.

Fixed Disk Drive Defect Fix (FN 32)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG32**
   Where:
   HG = 03 (to fix defects on fixed disk 1)
   HG = 04 (to fix defects on fixed disk 2)
   32 = Function number 32
3. Press ENTER.
4. One of the following codes is displayed:
   23xx = DEFECT FIX in progress (xx = The cylinder containing the sectors being fixed)
   4408 = DEFECT FIX complete; No new defects found.
   4409 = DEFECT FIX complete; All defects resolved.
   4410 = DEFECT FIX complete; IML Select Utility required. See "How to Perform Media Management" in the *3174 Utilities Guide*.
   4411 = DEFECT FIX complete; Data restoration required. See "How to Perform Media Management" and "How to Copy Files" in the *3174 Utilities Guide*.
   4412 = DEFECT FIX complete; Full FORMAT required.
5. If the test does not come to normal completion, press Advance and record the additional data. See the status code in the *3174 Status Codes* manual.
6. To continue testing at 4xxx, press ENTER; 4001 is displayed..

Fixed Disk Drive Full Format (FN 33)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG33**
   Where:
   HG = 03 (to format fixed disk 1)
   HG = 04 (to format fixed disk 2)
   33 = Function number 33.
3. Press ENTER.
4. 4415 Warning message is displayed ("Full Format will erase data").
   a. To abort the test, press ENTER; 4001 is displayed.
   b. To FORMAT, key in **2** and press ENTER.
5. One of the following codes is displayed on the panel, where

   23xx = FULL FORMAT in progress (xx = a number that decrements to 0).
   4416 = FULL FORMAT complete. Data restoration is required.
   See "How to Copy Files" and "How to Perform Media Management"
   in the *3174 Utilities Guide*.
   4417 = FULL FORMAT terminated; Drive replacement required.

6. If the test does not come to normal completion, press Advance and record the additional data. See the status code in the *3174 Status Codes* manual.
7. To continue testing at 4xxx, press ENTER; 4001 is displayed.

Display Fixed Disk Scan Defect Table (FN 34)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG34**

   Where:
   HG = 03 (to display scan defect table fixed disk 1)
   HG = 04 (to display scan defect table fixed disk 2)
   34 = Function number 34

3. Press ENTER.

4. See the Fixed Disk Scan Defect Table, Figure 2-5 on page 2-130, for a description of the results of Function 34.
5. One of the following codes is displayed:

   4420 = Defect Table complete
   4421 = Defect Table missing. Run Surface Scan (Function 31).

   Note: Function 31 must be run prior to selecting Function 34.

6. If the test does not come to normal completion, press Advance and record the additional data. See the status codes in the *3174 Status Codes* manual.
7. To continue testing at 4xxx, press ENTER; 4001 is displayed.

Scan Defect Table Output

In operator panel mode only the summary line is displayed. The example below is what would appear on the operator panel. (The advance key must be pressed to display each 2 bytes.) See the *3174 Status Codes* manual for an explanation.

```
4420 01HG 0008 0005 0002 0002 0001 0007 0000 0001 0003.
4420 = Status Code
  01 = Qualifier
  HG = Hardware Group
0008 = Total entries
0005 = count of new defects not previously resolved
0002 = count of defects containing data
0002 = count of defects in System area
0001 = count of defects in Manufactures Defect Table
0007 = count of hard defects
0000 = count of defects from format Utility termination
0001 = count of defects successfully recovered
0003 = count of defects successfully relocated
```

The following figure shows how the panel would display the Scan Defect Table.

```
                    _____Fixed Disk n Defect Table _____

Total entries:  tttt

                New   Used    Sys    OMD    Hrd   RNs    Rec    Rel

Totals          0005  0002    0002   0001   0007  0000   0001   0003

Cyl  Hd  Sct

0001 01  08       1     1       1      0      1     0      0      1
0003 00  06       1     0       1      0      1     0      0      1
0005 03  01       1     1       0      0      1     0      0      0
002B 03  0F       0     0       0      0      1     0      0      0
0072 00  10       1     0       0      0      0     0      1      0
010C 02  08       1     0       0      0      1     0      0      1
014F 00  11       1     0       0      0      1     0      0      1
0263 01  04       1     0       0      0      1     0      0      1

PF: 3=Quit    7=Back    8=Fwd
```

Where:

```
n    = number of the fixed disk drive
tttt = count of all defects found
Cyl  = Cylinder
Hd   = Head
Sct  = Sector
New  = count of new defects not previously resolved
Used = count of defects containing data
Sys  = count of defects in the System area
OMD  = count of defects in the Manufacturers Defect Table
Hrd  = count of hard defects
RNs  = count of defects from format Utility termination
Rec  = count of defects successfully recovered
Rel  = count of defects successfully relocated
```

Figure 2-5. Display Scan Defect Table in Terminal Mode (example)

CSU Surface Scan (FN 51)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. When 4001 is displayed, key in **HG51**

   Where:
   HG = 03 (to scan fixed disk 1)
   HG = 04 (to scan fixed disk 2)
   51 = Function number 51

3. Press ENTER.
4. One of the following codes is displayed:

   23xx = Surface Scan Test in progress (xx = a number that decrements to 0).
   4401 = SCAN complete; No new defects found.
   4402 = SCAN complete; DEFECT FIX recommended.
   4403 = SCAN complete; DEFECT FIX required.
   4404 = SCAN complete; Full FORMAT required.

5. If the test does not come to a normal completion, press Advance and record the additional data. See the status codes in the *3174 Status Codes* manual.
6. To continue testing at 4xxx; press ENTER, 4001 is displayed.

How to Read and Set the Timer

These tests provide the capability of setting and reading the timer counter and setting the day counter. The timer runs from 00:00 hours and minutes to 23:59 hours and minutes. The day counter runs from 0000 days to 0255 days. When the timer counter goes from 23:59 to 00:00, the day counter is increased by 1. When the day counter reaches 0255, it returns to 0000 when the time of day passes 23:59. When setting the timer, valid values are 0000 to 2359. When setting the day counter, valid values are 0000 to 0255.

Note: The timer and day counters are reset to zeros when the controller is powered off and on. This procedure has to be performed each time a POR occurs. If it is not performed, the timer defaults to starting time 00:00 and the day counter starts at 0000.

How to Read the Timer (FN 01)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001, key in **0801**
3. Press Enter.
4. The day counter is displayed. If terminal control is being used, the day and the time are displayed at the same time. Go to step 6.
5. Press Advance.
6. The time of day is displayed as HRMN.
7. Press Enter. 2008 is displayed.
8. To make another selection, press ENTER; 4001 is displayed.
9. If any other status code is displayed, go to the *3174 Status Codes* manual.

How to Set the Timer (FN 02)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001, key in **0802**
3. Press ENTER; 4542 is displayed.
4. Key in the day, any value from **0000** to **0255**. If terminal control is being used, the day and the time of day can be entered at the same time. Enter all eight digits without spaces, and press ENTER, then go to Step 8.
5. Press Advance.
6. Key in the time, any value from 0000 to 2359 in the format HRMN where:

   HR = Hours
   MN = Minutes.
7. Press ENTER. 2008 is displayed.
8. To make another selection, press ENTER; 4001 is displayed.
9. If any other status code is displayed, go to the *3174 Status Codes* manual.

How to Run the Operator Panel Test

This test verifies that the keypad, function pushbuttons, indicators, and the status indicators are functioning correctly on the 3174 operator panel. Since manual intervention is required at the operator panel, the procedure below shows this test being performed only at the operator panel.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. At 4001, key in **09** and press ENTER. 4505 is displayed in the Status indicators.
3. Press the listed keys on the operator panel keypad and verify that the correct character is displayed in the four Status indicators.

Key Pressed	**Result**
0—9	0-9
Clear	E
Alt 1	H
Alt 1 (again)	- (dash)
Alt 2	L
Alt 2 (again)	blank
Advance	P

4. Observe the red and green indicators on the operator panel, and press any numeric key 0—9:
   a. Red indicator goes off.
   b. Green indicator comes on for about 1.5 seconds.
   c. About 5 seconds later, the red indicator comes on.
5. Press ENTER.
6. If successful-completion message 2009 is displayed, press ENTER for the 4001 prompt message.
7. If not successful, see MAP 0110.

How to Run Communication Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Before selecting a function number, determine if the controller has a Type 1 or Type 2 communication or Concurrent Communication Adapter. Check card locations 22, 23, and 12 to 16 for one of the following:

   Type 1 = FRU type number 9153.
   Type 1 = FRU type number 9263.
   Type 2 = FRU type number 9267.
   Type 2 = FRU type number 927X.

   Note: Table 2-6 and the paragraphs following "Communication Adapter Function Number Descriptions" on page 2-135 describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.
3. At 4001, key in **HG FN**

   Where:

   HG = 11, 51 or 52
   FN = Function number (select from Table 2-6).
4. Press ENTER; the test begins.
5. One of the following codes are displayed on the status indicators, where HG equals the hardware group being tested:

   21HG = Test in progress
   22HG = Test in progress
   20HG = Test completed
   3030 = Test failed
   For code 3030 and all other status codes, see the *3174 Status Codes* manual.
6. To make another selection or to terminate the test, press ENTER.

Table 2-6. Function Numbers (Communication)

FN	Description	Condition
01	Interface Wrap Test	• For EIA. Set the interface cable Test/Oper switch to Test or use wrap plug part 6423419. • For V.35. See "V.35 Cable Wrap Test (Three Test/Oper Switches)" on page 2-136 and "V.35 Cable Wrap Test (One Test/Oper Switch)" on page 2-136. • For X.21. Set the interface cable Test/Oper switch to Test or use wrap plug part 6423420.
02	Modem Wrap	• Set the interface cable Test/Oper switch to Oper. • The modem must be wrappable and powered on.
04	Type 1 Interface Status Test	• Set the cable Test/Oper switch to Oper. • The modem must be attached and powered on.
05	Type 2 Interface Clock Test.	• Set the cable Test/Oper switch to Test.
07	Type 1 Driver Static Test	• Disconnect the interface cable from the modem. • Set the Test/Oper switch to Oper.

Communication Adapter Function Number Descriptions

The following paragraphs describe the function numbers for type 1 (EIA/V35) and type 2 (X.21) communication adapters.

Interface Wrap Test (FN 01)

This test provides a data wrap of the driver/receiver portion of the Type 1 or Type 2 communication adapters. With the external interface cable connected to the 3174 and disconnected from the modem, the data is wrapped through the Test/Oper switch on the interface cable. A wrap plug for each adapter is available as a branch office tool that can be used in place of the interface cable. To ensure a valid wrap test, the following condition must be met:

For Type 1 Communication Adapter (EIA/V.35)

Connect the external interface cable to the 3174 and disconnect it from the modem and set the Test/Oper switch to Test, or install wrap plug (P/N 6423419) on the communication adapter card. For V.35, see "V.35 Cable Wrap Test (Three Test/Oper Switches)" on page 2-136 and "V.35 Cable Wrap Test (One Test/Oper Switch)" on page 2-136.

For Type 2 Communication Adapter (X.21)

Connect the external interface cable to the 3174 and disconnect it from the modem and set the Test/Oper switch to Test, or install wrap plug part 6423420 on the communication adapter card.

Notes:

1. Function number 01 runs automatically when customer setup tests (HG 81) are performed.
2. This wrap test does not fail if only one of the Signal A or Signal B lines is broken (V.35 and X.21).

Modem Wrap (FN 02)

This test provides a data wrap through the external modem. This test is valid for both Type 1 and Type 2 communication adapters. To ensure a valid wrap test, the following conditions must be met:

- The modem must be wrappable. (See documentation for your modem.)
- The external interface cable must be connected to the communication adapter and to the modem.
- The Test/Oper switch on the cable is set to Oper.

Type 1 Interface Status Test (FN 04)

This test checks 'data set ready' and 'receive line signal detect' (also called *'carrier detect'*). A status code is written to the Status indicators in 2-second intervals to indicate the status of these two interface leads. Status code 4513 means both lines are on. Status codes 4510 – 4512 indicate other conditions for these lines. If other status codes are displayed, see the *3174 Status Codes* manual. This test is only for the type 1 communication adapter (EIA/V.35). To ensure a valid test, the external interface cable must be connected to the communication adapter and to the modem. The Test/Oper switch on the cable is set to Oper. Once this test is running, it will not stop until the ENTER key is pressed.

Type 2 Interface Clock Test (FN 05)

This test provides a data wrap through the attached modem using the modem clock. This test is only for the type 2 communication adapter (X.21). To ensure a valid test, the external interface cable must be connected to the communication adapter and to the modem. The Test/Oper switch on the cable is set to Test.

Type 1 Driver Static Test (FN 07) (NTT Japan)

This test sets the following interface leads to their logical on condition for measurement purposes: 'data terminal ready' (DTR), 'request to send' (RTS), 'data set ready' (DSR), 'Test,' and 'select standby' (Sel Stby). This test is valid only for the Type 1 communication adapter. Status code 4514 indicates the interface leads are at their logical on condition. Once this test is running it does not stop until the ENTER key is pressed.

V.35 Cable Wrap Test (Three Test/Oper Switches)

This procedure is used with the V.35 interface cable that has three Test/Oper switches on the end. This cable provides better detection of adapter/cable problems when either the A or B signal (receive, transmit, or clock) is failing. The wrap provided with communication adapter FN 01 is used in conjunction with the Test/Oper switch. See Figure 2-6 and Table 2-7 for the switch settings of the Test/Oper switches before starting the wrap test. The cable should be disconnected from the modem when running this test. If any other switch setting is used, the wrap test fails.

Table 2-7. V.35 Test/Oper Switch Settings

Description	Switch 1	Switch 2	Switch 3
Test Mode 1 (Wrap A Lines)	Test	Oper	Test
Test Mode 2 (Wrap B Lines)	Test	Test	Oper
Test Mode 3 (Wrap A and B Lines)	Test	Test	Test
Operate	Oper	Oper	Oper

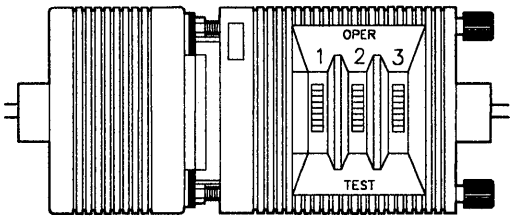


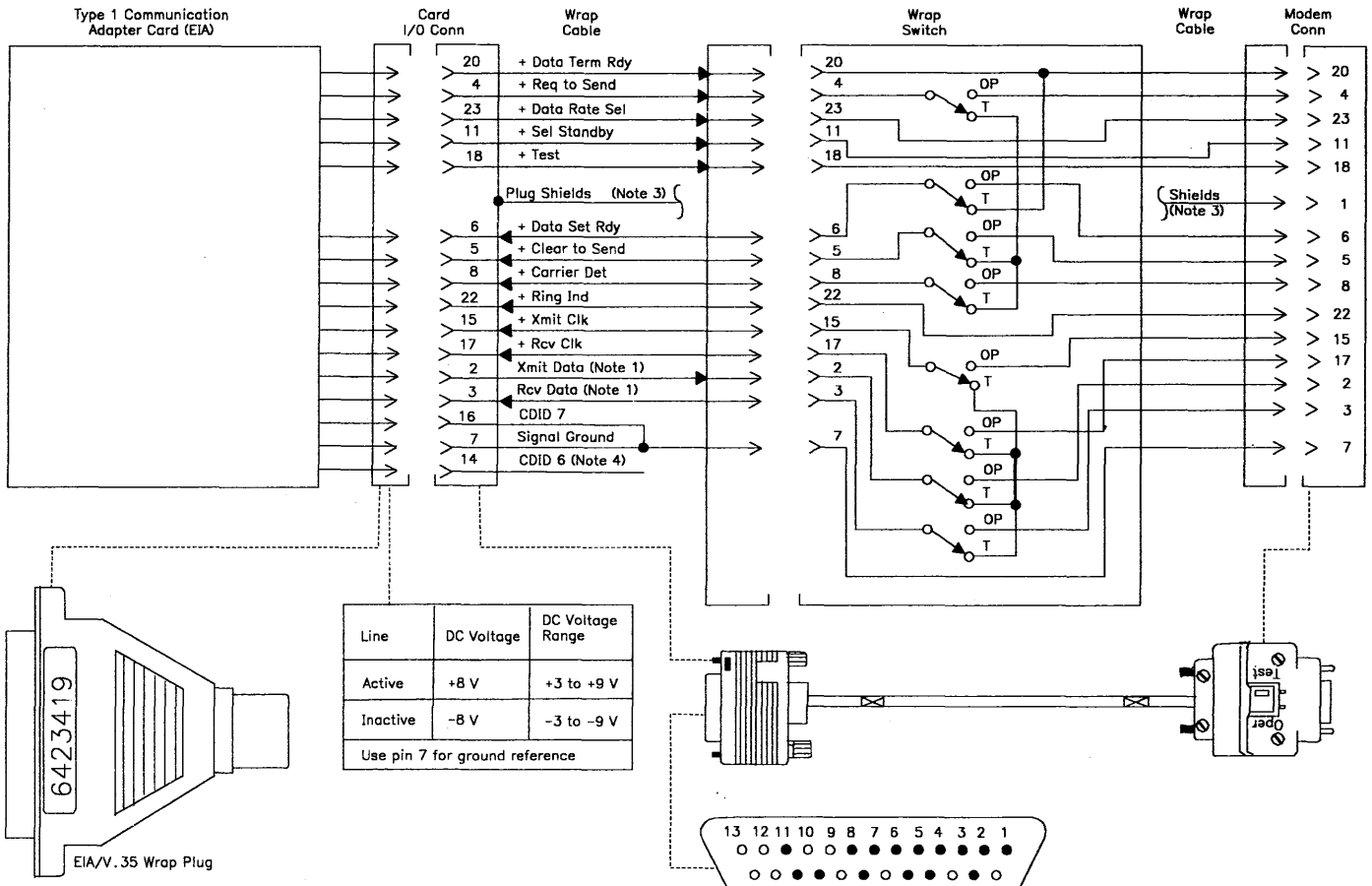
Figure 2-6. V.35 Three-Switch Test/Oper Switch

V.35 Cable Wrap Test (One Test/Oper Switch)

On early-production 3174 Establishment Controllers, the V.35 communication interface cable has a one-position Test/Oper switch. A special wrap plug (P/N 61X4603) is shipped with the controller. The wrap plug is tied to the end of the cable near the Test/Oper switch. This wrap plug is used in conjunction with communication adapter FN 01 to test the early-production V.35 interface cables. The cable should be disconnected from the modem any time this test is run.

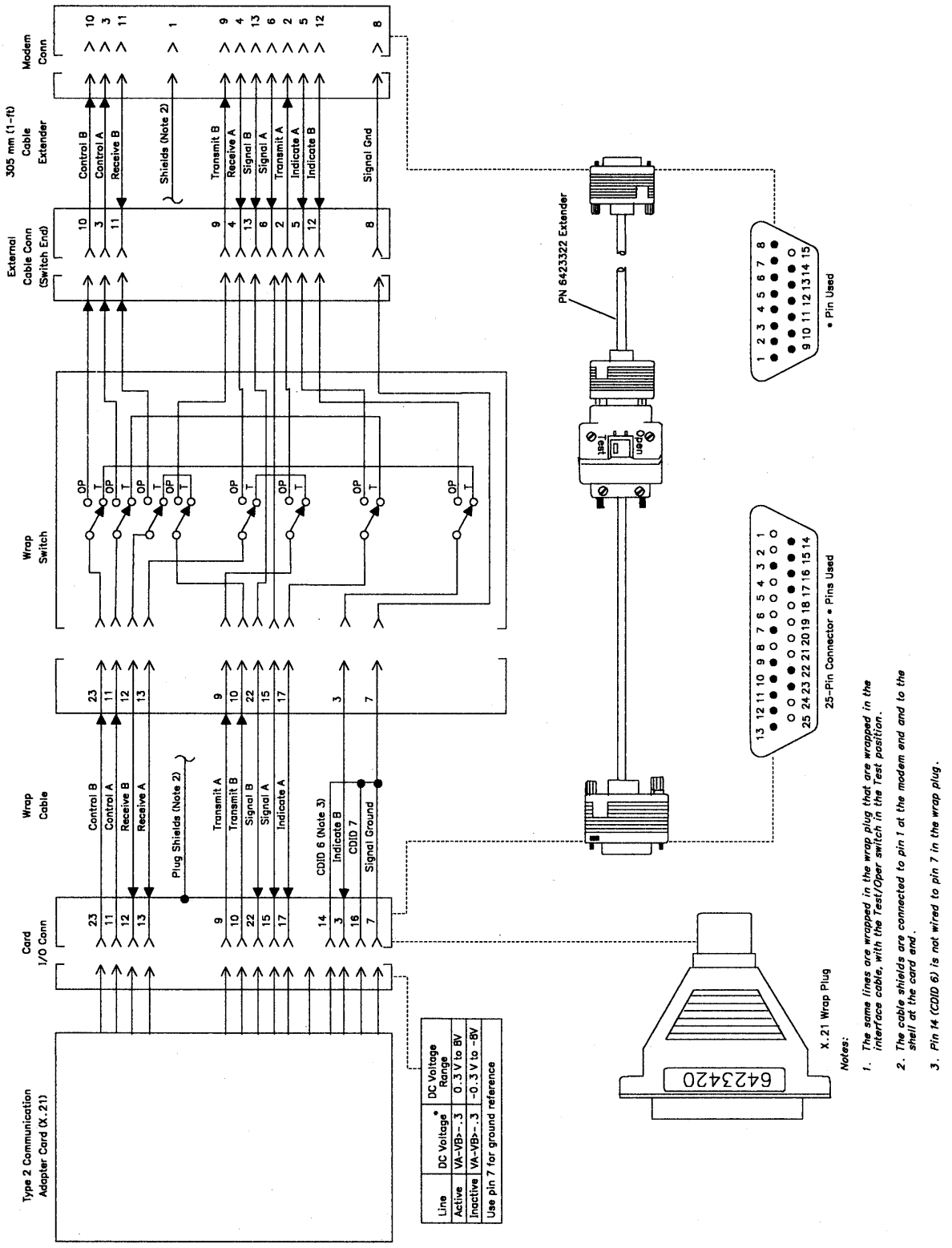
1. Disconnect the interface cable from the short modem adapter cable.
2. Set the Test/Oper Switch to **Oper**.
3. Install the wrap plug (P/N 61X4603) at the end of the cable that has the Test/Oper switch.
4. Perform the communication adapter wrap test FN 01.

Figure 2-7. EIA Communication Line Flow (Cable and Wrap Plug)



Notes:

1. *Xmit/Rcv Data Active Voltage is Mark or Data Bit On. Inactive voltage or data bit off.*
2. *The same lines are wrapped in the wrap plug that are wrapped in the interface cable with the Test/Oper switch in the Test position. The interface lines Test to Ring Ind are also wrapped.*
3. *The cable shields are connected to pin 1 at the modem end and to the shell at the card end.*
4. *Pins 14 and 16 are wired together in the wrap plug.*



(Cable and Wrap Plug)

Figure 2-8. X.21 Communication Line Flow (Switched and Nonswitched)

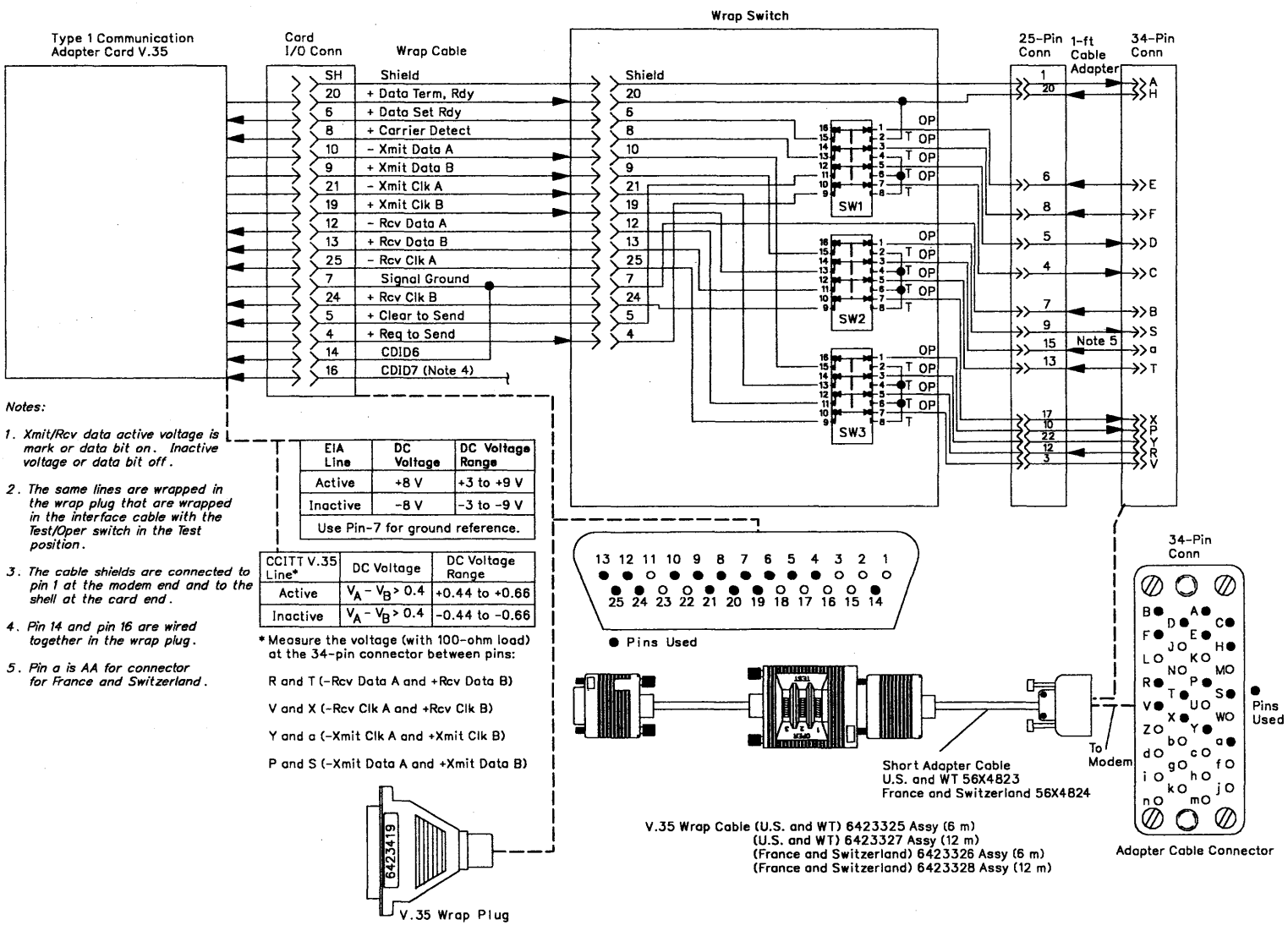


Figure 2-9. V.35 Communication Line Flow (Cable and Wrap Plug)

How to Run the Channel Driver/Receiver Wrap Test (FN 01)

Warning: The host system operation will be interrupted if you do not use the proper procedure to take the 3174 offline. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

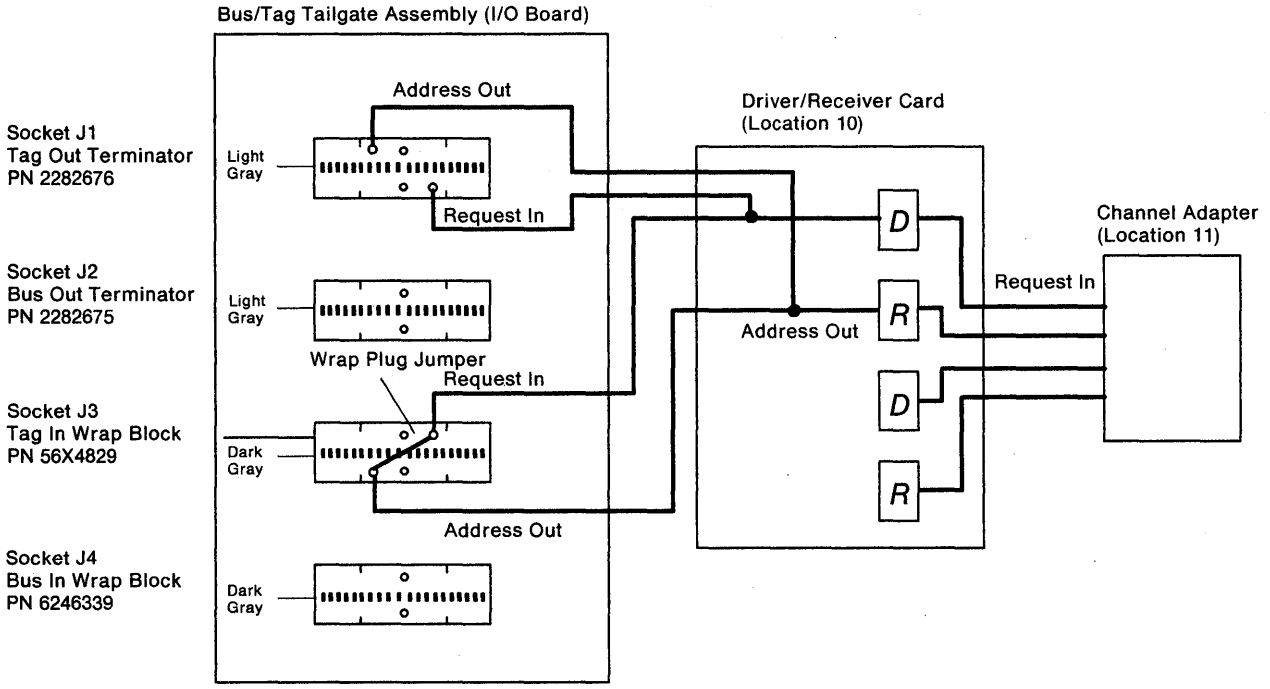
The Channel Driver/Receiver Wrap Test checks the data path from the channel adapter through the driver/receiver card to the Tag In and Bus In positions on the bus/tag tailgate assembly. The Bus Out and Tag Out data paths from the driver/receiver card to the tailgate are not tested. Figure 2-10 on page 2-141 shows an example of the data path that is tested. To perform the wrap test, the following conditions must be met:

- The controller must be offline from the host system.
- The channel interface cables must be disconnected from the controller and connected together.
- The bus terminator and the tag terminator must be installed in the Bus Out and Tag Out positions, respectively.
- The wrap blocks must be installed.
- The priority switches must be set to High or Low priority.

Use the following procedure to perform the wrap test.

1. Take the controller offline.
2. Disconnect the channel interface cables; see "How to Disconnect the Bus and Tag Cables" on page 2-288 and Figure 2-11 on page 2-141.
   Install the following:
   The Tag terminator (P/N 2282676) in position J1 (Tag Out)
   The Bus terminator (P/N 2282675) in position J2 (Bus Out)
   The Tag wrap block (P/N 56X4829) in position J3 (Tag In)
   The Bus wrap block (P/N 6246339) in position J4 (Bus In).
3. Record the positions of the priority switches; set the switches to High or Low priority. See "Priority Switches" on page 4-2.
4. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
5. At 4001, key in **1601**
6. Press Enter.
7. One of the following codes are displayed in the status indicators:

   2116 = Test in progress
   2216 = Test in progress
   2016 = Test completed
   3011 = Test failed (go to "Wrap Test Analysis" on page 2-142)
   For all other status codes, see the *3174 Status Codes* manual.
8. To continue testing, press Enter; 4001 is displayed.
9. To exit testing, perform the following steps.
10. If changed, set the priority switches to their original positions.
11. Remove the wrap blocks.
12. If the terminator assemblies had to be installed in this controller, remove them.
13. Install the channel interface cables.
14. Place the controller online; see "How to Place the 3174 Online (Models 1L and 11L Only)" on page 2-287.
15. Perform a normal IML.



Note: *This figure shows two of the 38 Bus and Tag lines that are tested by running the wrap test. The Test data patterns activate the Request In driver; the test then verifies that the Address Out signal is received at the channel adapter card.*

Figure 2-10. Channel Driver/Receiver Wrap Test Data Flow

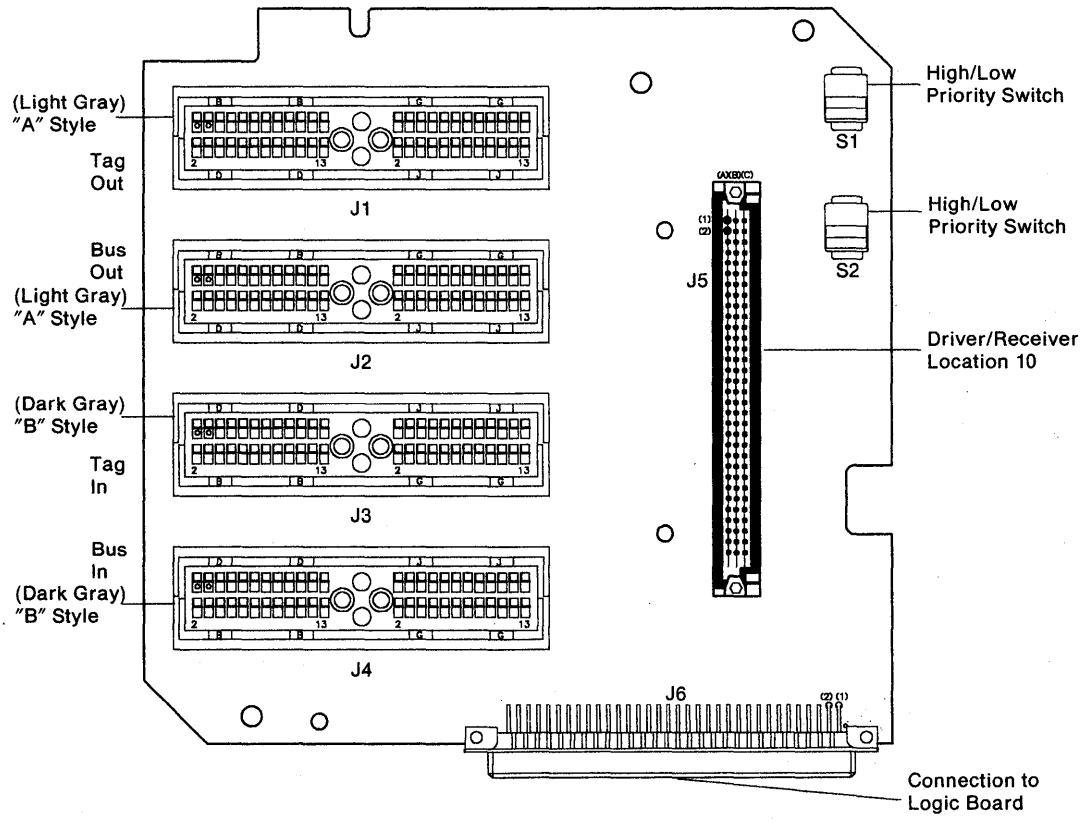


Figure 2-11. Bus/Tag Tailgate Assembly Socket and Pin Locations

Wrap Test Analysis

Status code 3011 indicates that a line or lines in the data path have failed. To identify which lines are failing, perform the following steps:

1. Press Advance and record the numbers as they appear in the Status indicators.
2. Status code 3011 is displayed in the following format:

   3011 0316 TYPE LOCA XXYY

   Where:

   3011 = Status code
   0316 = Qualifier and hardware group
   TYPE = FRU type number
   LOCA = FRU location
   XXYY = Failing line(s):
   XX = 1X, 2X, or 3X = the first failing line
   YY = 1Y, 2Y, or 3Y = the next failing line

   YY = 00 = Only one line is failing, or the test reported one line failing. The first failing line indicated by XX must be repaired and the wrap test has to be performed again until the test runs with no failures.

Use Tables 2-8 and 2-9 to identify the failing lines. Repair the failing line(s). Visually inspect the cable connectors, I/O block, or terminators for bent or broken contacts.

Note: If you were sent here from MAP 0920, return to the MAP and continue with problem isolation.

Example of a wrap test failure, where:

```
XXYY = 2100 = J06 to B10  Tag Req In to Adr Out.

XXYY = 1732 = G12 to B12  Bus In/Bus Out 7
              G08 to G10  Tag Dat IN/Dat Out
```

Table 2-8. Wrap Test Analysis Chart A

XX/ YY	J4	J4	Name of Line
10	J04-to-	D04	Bus In/Bus Out 0
11	G05-to-	B05	Bus In/Bus Out 1
12	J06-to-	D06	Bus In/Bus Out 2
13	G08-to-	B08	Bus In/Bus Out 3
14	J09-to-	D09	Bus In/Bus Out 4
15	G10-to-	B10	Bus In/Bus Out 5
16	J11-to-	D11	Bus In/Bus Out 6
17	G12-to-	B12	Bus In/Bus Out 7
18	G03-to-	B03	Bus In/Bus Out P
19	J13-to-	D13	Bus In/Out Mko

Table 2-9. Wrap Test Analysis Chart B

XX/ YY	J3	J3	Name of Line
21	J06-to-	B10	Tag Req In/Adr Out
22	B03-to-	J13	Tag Opl In/Opl Out
23	B05-to-	B12	Tag Adr In/Sup Out
24	D04-to-	D11	Tag Sta In/Com Out
25	D06-to-	D13	Tag Srv In/Srv Out
26			Reserved
27			Reserved
30	B08-to-	D09	Tag Sel In/Sel Out
31	J11-to-	G12	Tag Dis In/Hld Out
32	G08-to-	G10	Tag Dat In/Dat Out
33	G05-to-	J04	Tag Mtr In/Mtr Out
34			Reserved
35			
36			
37			

Figures 2-12 and 2-13 show the Bus and Tag communication line flow.

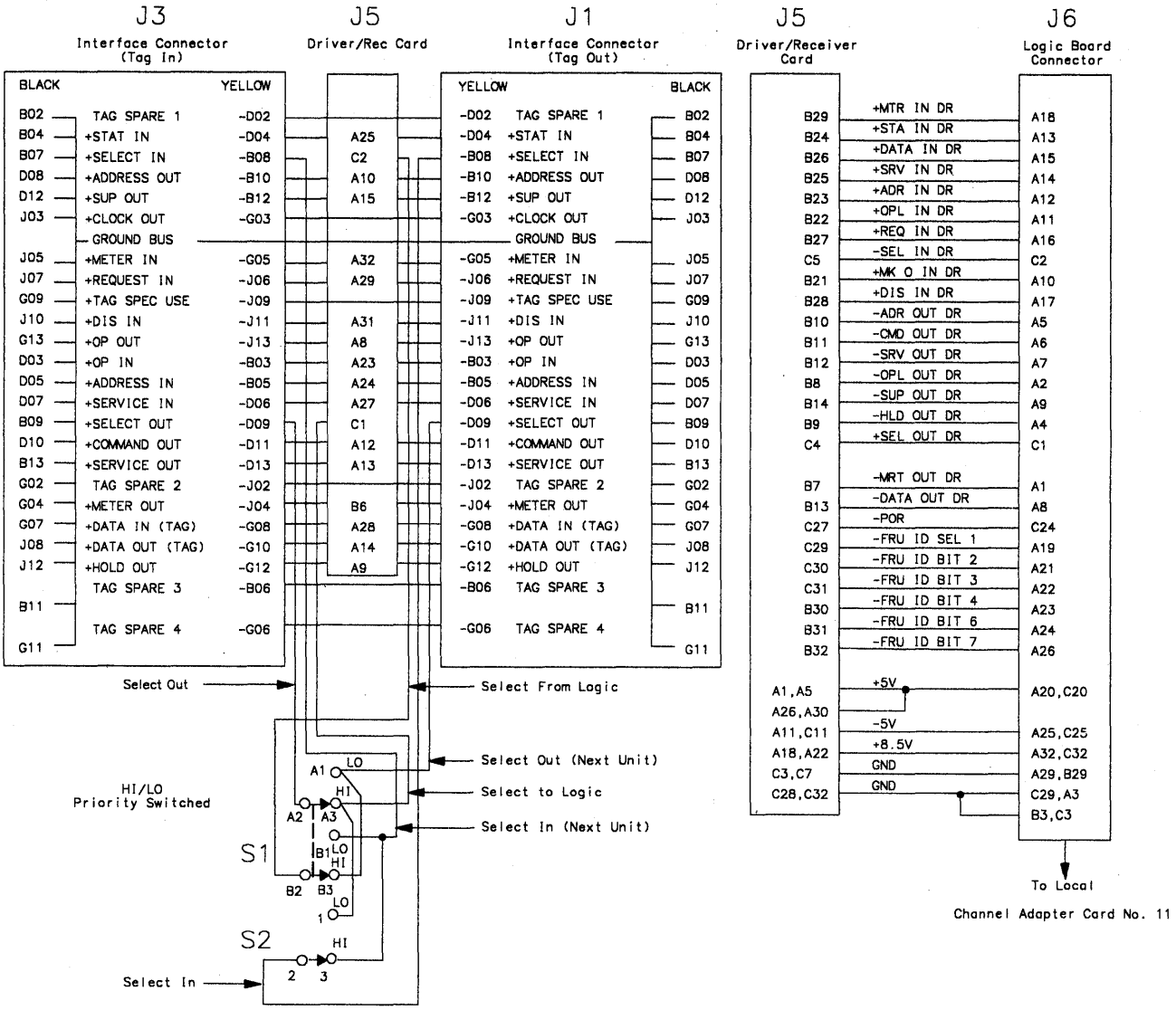


Figure 2-12. Tag In/Tag Out Communication Line Flow

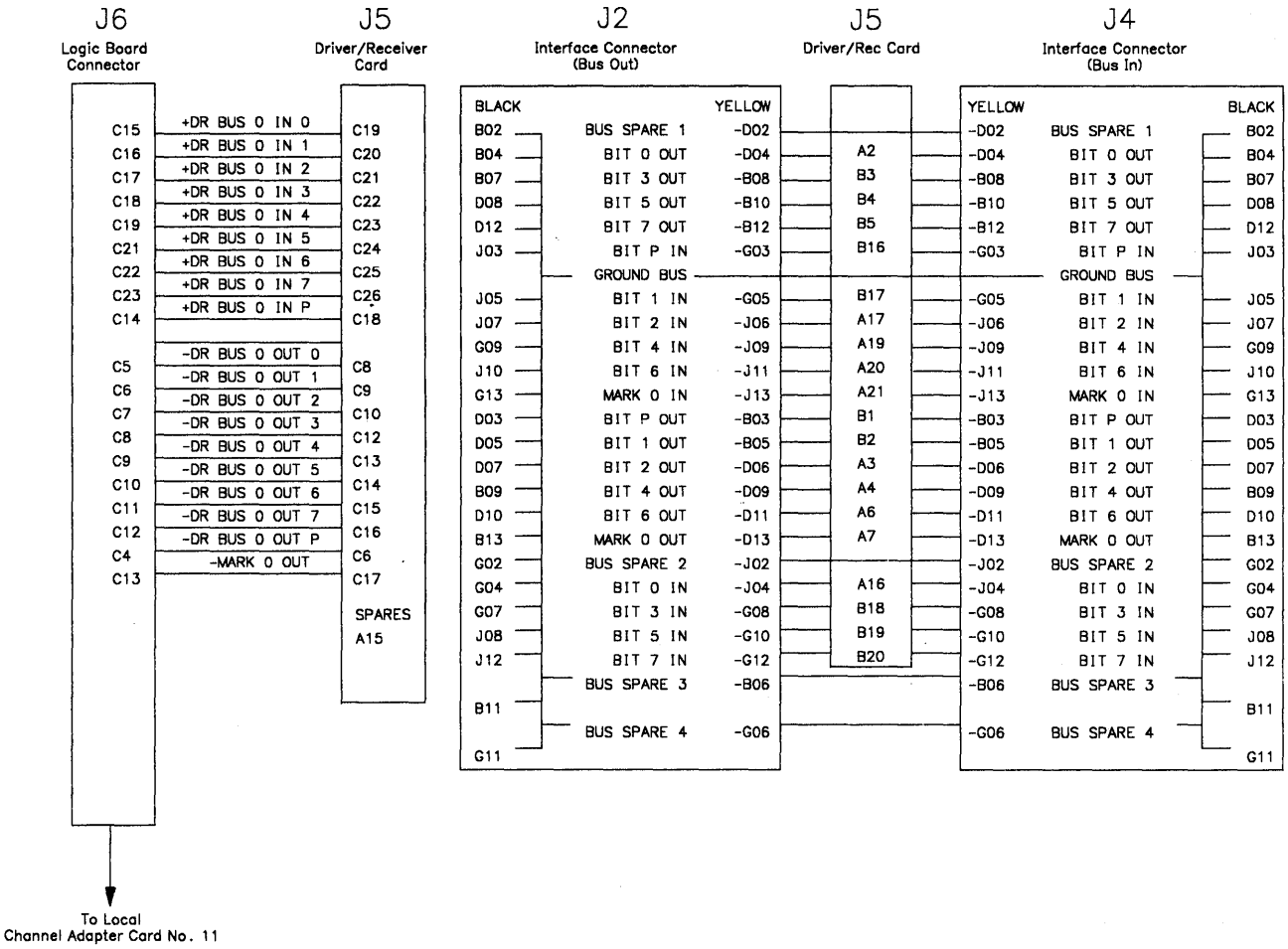


Figure 2-13. Bus In/Bus Out Communication Line Flow

How to Run the Channel Interface Switch and Indicator Test (FN 02)

This test verifies that the Channel Interface switch and the offline indicator are functioning correctly.

It is recommended that this test be performed at the controller because manual intervention is required for successful completion of the test.

1. Take the controller offline. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.
2. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
3. At 4001, key in **1602**
4. Press ENTER; 4530 is displayed, and the offline indicator turns on.
5. Move the Channel Interface switch to Online; 4531 is displayed, and the offline indicator turns off.
6. Move the Channel Interface switch to Offline; 4530 is displayed, and the offline indicator turns on. Move the channel switch from Offline to Online as many times as necessary to verify that the Channel Interface Switch is working correctly. If the display does not change, see status code 4530 and 4531 for the repair action.
7. To make another selection, press ENTER; 4001 is displayed.
8. If any other status code is displayed, go to the *3174 Status Codes* manual.

How to Run Asynchronous Emulation Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Disconnect the external interface cable from the port to be tested and install the wrap plug (P/N 61X4602).
3. At 4001, key in **HG FN FP**

   Where:

   HG = 21, 22, or 23
   FN = 01
   FP = 00-07
4. For operator panel control, when keying in more than four digits, press Advance after each group of four until the last digit keyed is displayed.
5. Press ENTER;
6. One of the following codes is displayed in the status indicators where:
   21, 22, or 23 equals the hardware group being tested:

   20HG = Test completed without error
   21HG = Test in progress
   22HG = Test in progress
   3060 = Test failed
   3061 = Test failed
   For status codes 3060, 3061, and all other status codes, see the *3174 Status Codes* manual.
7. To terminate the test or to make another selection, press ENTER.

   Note: When this test is being looped in terminal control mode, it may be necessary to press the Enter key on the controller operator panel to stop the test.

Asynchronous Emulation Adapter Function Number Description (FN 01)

Asynchronous Emulation Adapter Port Driver/Receiver Wrap (FN 01) This function number provides an internal wrap test on individual ports of the Asynchronous Emulation Adapter card. The function parameter is used to specify the port number to be wrapped (00-07). The AEA Wrap Plug (61X4602) must be connected to the port being wrapped.

Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring

The following pages explain and illustrate the various types of cabling used for attachment to the Asynchronous Emulation Adapter. The illustrations show the pin-to-pin assignments of the cables and wrap plug, and the use of the "null modem." Some of these cables cannot be wrapped using the offline tests and must be checked for continuity.

Switched and Nonswitched Modem Cable

The modem cable for switched and nonswitched (leased) lines has a 25-pin D-shell connector on each end. Nine of the pins are used and wired one-for-one for data terminal equipment (DTE) to data communications equipment (DCE) attachment. (See Figure 2-14.) This cable must meet the EIA 232 interface requirements as specified in the *3174 Establishment Controller Site Planning Guide*, GA23-0213.

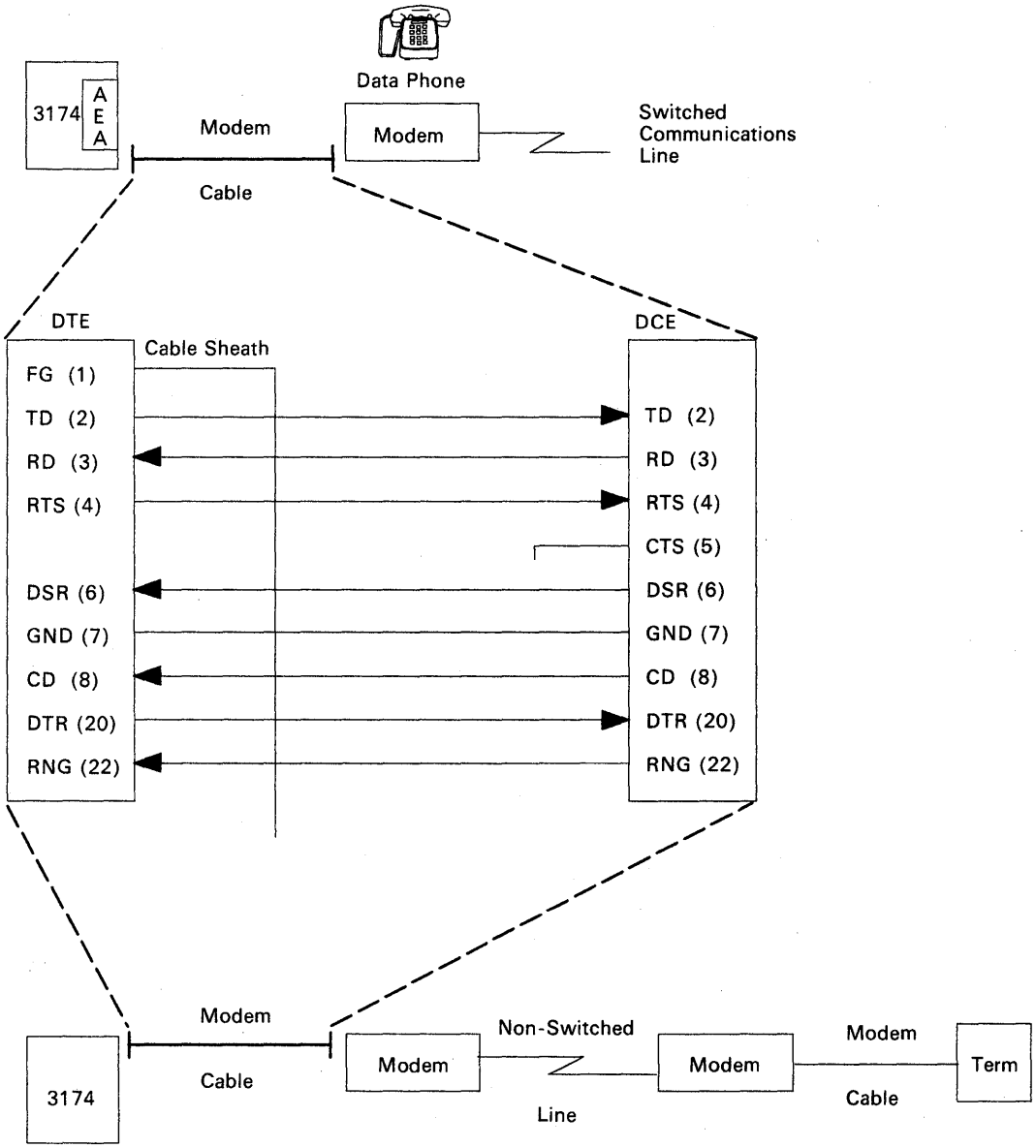


Figure 2-14. Switched and Nonswitched Line Modem Cable

Direct Cable

The direct cable is used to attach an ASCII terminal or host directly to the 3174 controller. It has a 25-pin D-shell connector at each end and must be between 1 to 15 meters (3 to 50 feet) in length. The controller or device end connector must be wired according to Figure 2-15. This cable must meet specifications for direct connect cabling found in the *3174 Site Planning Guide*, GA23-0213.

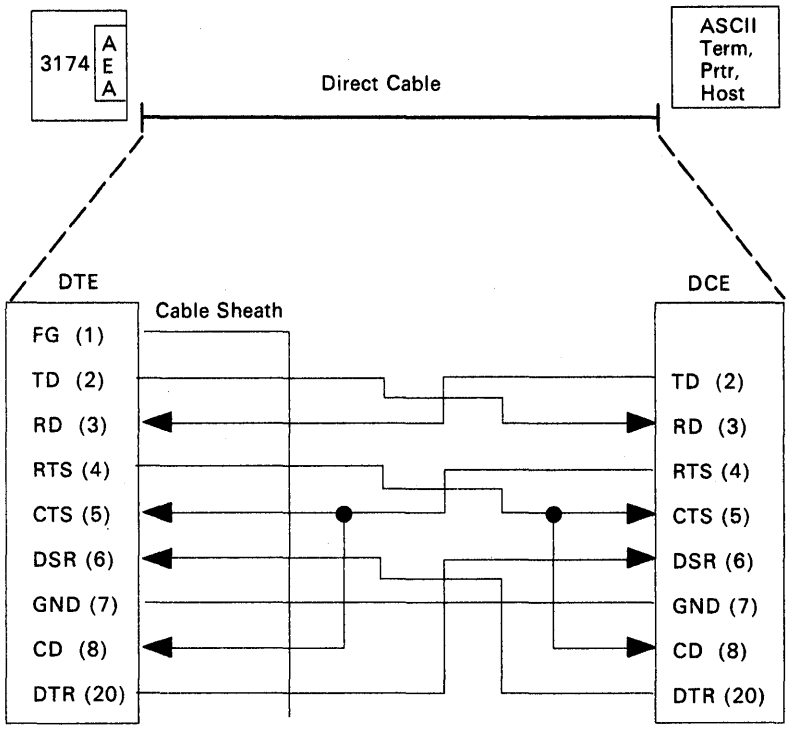


Figure 2-15. Direct Cable

Direct Cabling Using a Null Modem

This cabling arrangement is an alternate method of a direct connector between a 3174 controller and an ASCII device (terminal or host). The null modem is simply a "black box" with two male 25-pin D-shell connectors. The wiring allows attachment to an ASCII terminal or host using a standard one-to-one cable. See Figure 2-16.

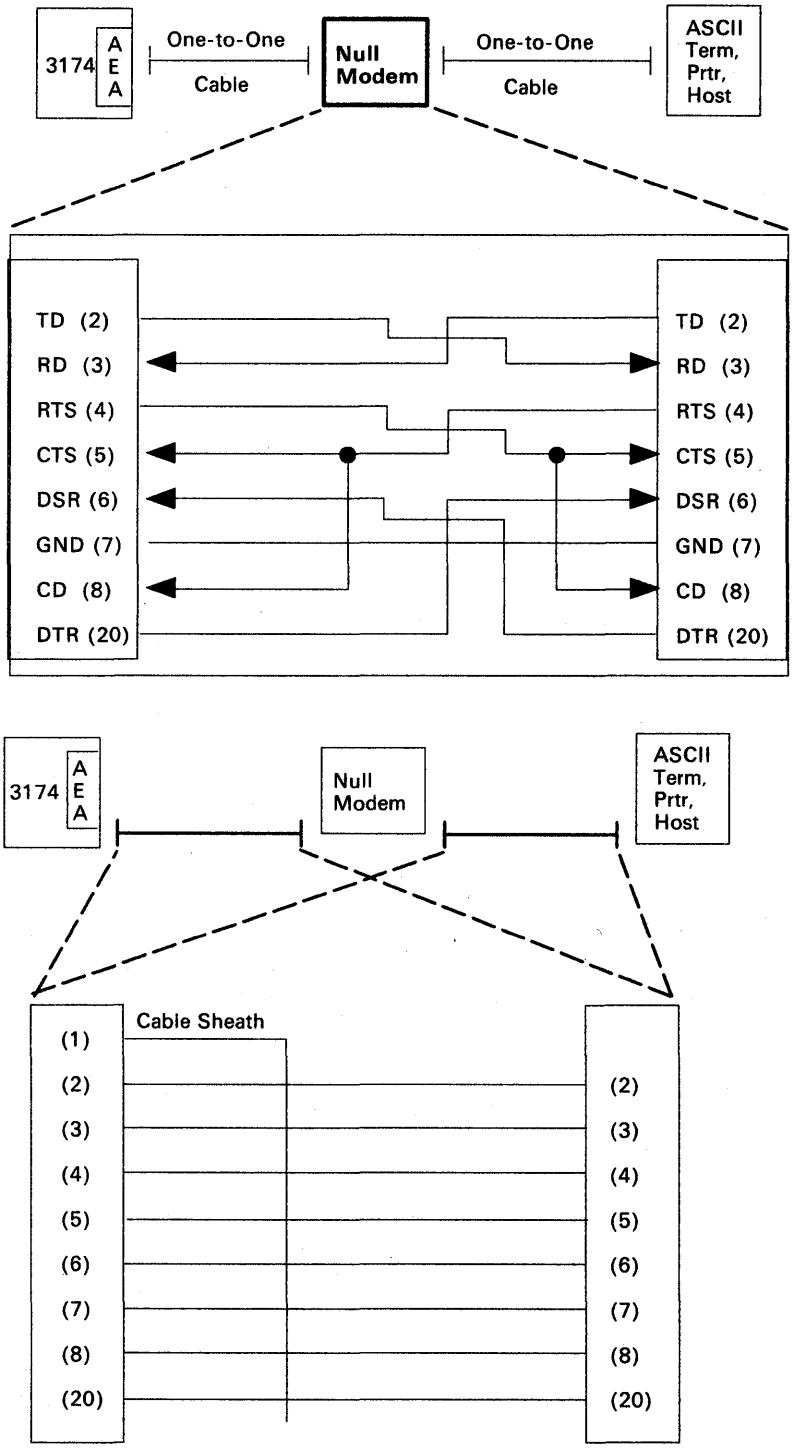
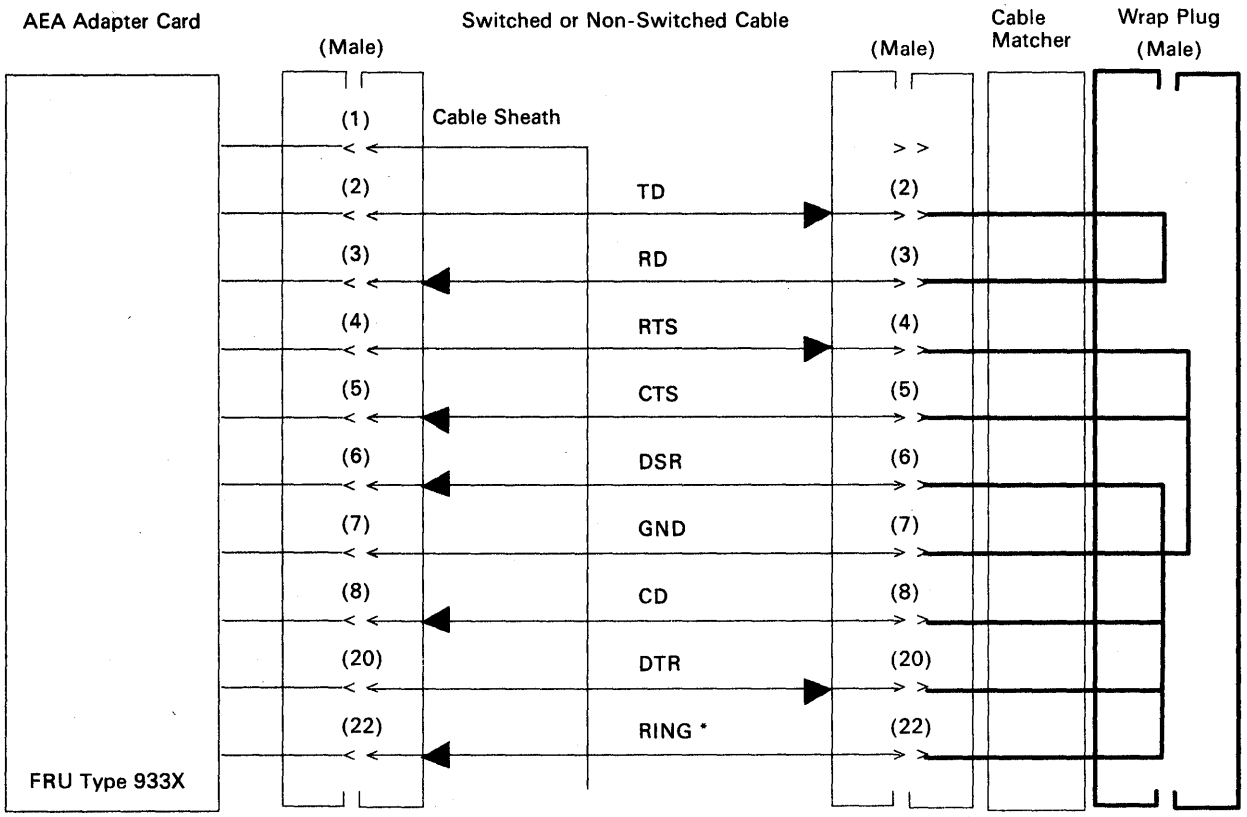


Figure 2-16. Direct Cabling Using a Null Modem

Asynchronous Emulation Adapter Wrap Plug Wiring

The illustration below shows the wiring of the Asynchronous Emulation Adapter wrap plug in conjunction with the switched and nonswitched communication cable. The wrap plug must be connected to a gender converter before installation to the cable is possible. (The cable and the wrap plug both have male connectors.)

The direct cable, shown in Figure 2-15 on page 2-149, cannot be wrapped using the Asynchronous Emulation Adapter wrap plug. The EIA Interface Monitor Test Set (breakout box P/N 453637) is required to wrap that cable and also possibly a gender converter.



* Switched Only

Figure 2-17. Switched and Nonswitched Cable with Wrap Plug

How to Run Terminal Adapter/TMA Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Select a function number (FN) and function parameter (FP).

   Note: Table 2-10 and the paragraphs following Table 2-10 describe the purpose of each function number/function parameter and any prerequisite conditions that have to be met before a particular function number/function parameter can be used.

3. At 4001, key in **HG FN FP**

   Where:

   HG = 26
   FN = Function number
   FP = Function parameter.

4. For operator panel control, when keying in more than four digits, press Advance after each group of four until the last digit keyed is displayed.
5. Press ENTER; the test begins.
6. One of the following codes is displayed in the status indicators.

   2126 = Test in progress
   2226 = Test in progress
   2026 = Test completed
   3040 = Test failed
   3041 = Test failed
   3042 = Test failed
   4550 = Test completed

   For status codes 3040, 3041, 3042, and all other status codes, see the *3174 Status Codes* manual.

7. To terminate the test or to make another selection, press ENTER.

   Note: When these tests are being looped in terminal control mode, it may be necessary to press the ENTER key on the controller operator panel to stop the test.

Table 2-10. Function Numbers and Function Parameters (Port Wrap)

FN	Description	FP	Description	Condition
01	Terminal Adapter Port Wrap	00, 08, 16, 24	Terminal Adapter Port 00, 08, 16, 24	Disconnect the terminal adapter port signal cable.
02	Multiplexer Port Wrap	00-31	Logical Port 00 – 31	Disconnect the multiplexer port signal cable.
03	Terminal Path Test	00 – 31	Logical Port 00 – 31	Terminal attached and powered on.
04	CUT Display Exerciser	00-31	Logical Port 00-31	• Terminal attached and powered on. • The terminal must be a 3278 or equivalent.
05	Terminal Adapter Wrap All			Disconnect port 00, 08, 16, and 24 signal cables.
06	Multiplexer Wrap All	00, 08, 16, 24	Terminal Adapter Port Number	Disconnect the output signal cables from the multiplexer.
07	Printer Exerciser Test	00 – 31	Logical Port 00 – 31	Printer attached, powered on and ready.

Terminal Adapter Function Number Descriptions

See the following paragraphs and to Figure 2-18 on page 2-154 for descriptions of the port wrap function numbers.

Terminal Adapter Port Wrap (FN 01)

This function number provides an internal wrap test on individual ports on the terminal adapter card. The function parameter is used to specify the port number to be wrapped. Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

Multiplexer Port Wrap (FN 02)

This function number provides an internal wrap of the output ports on a TMA card, a 3299 Terminal Multiplexer Model 2 or 3, or a 7232 Dual Control Unit Terminal Multiplexer. The function parameter is used to specify the logical port number to be wrapped. This number is obtained by adding the terminal adapter card port number to which the multiplexer is connected to the multiplexer port number.

Example:

To wrap port 2 on the TMA card that is connected
to port 16 on the terminal adapter card, enter **18**
as the function parameter.

Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

Note: Wrap Test (FN 02 and 06) cannot be performed on a 3299 Terminal Multiplexer Model 1.

Terminal Path Test (FN 03)

This function number provides a path test on any supported terminals or printers that are directly attached to the terminal adapter or attached through a multiplexer. The path to the terminal is automatically determined by the diagnostic. The function parameter is used to specify the logical port number of the terminal to be tested. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. Status code 4550 indicates successful test completion. Status code 3041 indicates the test failed.

Terminal Exerciser Test (FN 04)

This function number provides a data test to terminals that are directly attached or attached through a multiplexer. The physical path to the terminal is automatically determined by the test. The function parameter is used to specify the logical port number of the terminal to be tested. A data pattern appears on the 3278 or similar terminal when this test is performed. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. This test is restricted to 3278s or equivalent terminals. Status code 4050 indicates successful test completion. Status codes 3041 and 3042 indicate that the test failed.

Terminal Adapter Wrap All (FN 05)

This function number provides an internal wrap of the four ports on the terminal adapter card. A function parameter is not required for this function number. Status code 2026 indicates successful test completion. Status code 3040 indicates that the test failed.

Multiplexer Wrap All (FN 06)

This function number provides an internal wrap of the eight output ports on a TMA card, a 3299 Model 2 or 3, or a 7232 Dual Control Unit Terminal Multiplexer. The function parameter is used to specify the port number on the terminal adapter card that the multiplexer is attached to.

Notes:

1. Wrap tests (FN 02 and 06) cannot be performed on 3299 Terminal Multiplexer Model 1.
2. Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.
3. Function numbers 05 and 06 run on the terminal adapter and terminal multiplexer adapter(s) when the customer setup (HG81) test is performed.

Printer Exerciser Test (FN 07)

This function number provides a data test to printers that are directly attached or attached through a multiplexer. The path to the printer is automatically determined by the test. The function parameter is used to specify the logical port number of the printer to be tested. A single line of data prints on the printer being tested. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. This test is restricted to IBM 3262, 3268, 3287, 3289, 4214, 4224, 4234, 4245, 5210, or equivalent printers. Status code 4550 indicates successful test completion. Status code 3041 and 3042 indicate the test failed.

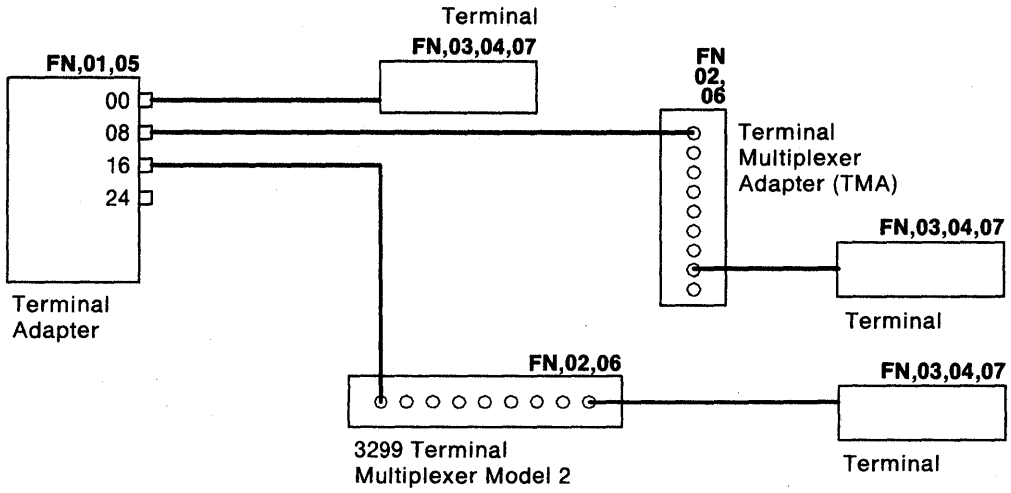


Figure 2-18. Block Diagram of Terminal Adapter Terminal Attachment

How to Run Token-Ring Adapter Optional Tests

Warning: Do not run the adapter wrap (FN 02) with the Token-Ring adapter cable attached to the controller and the ring. If the cable is attached to the ring, Token-Ring problems occur.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-119.
2. Select a function number.

   Note: Table 2-11 and the paragraphs following "Token-Ring Adapter Function Numbers" describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.

3. At 4001, key in **HG FN**

   Where:

   HG = 31
   FN = Function number

4. Press ENTER; the test begins.
5. One of the following codes is displayed in the status indicators:

   2131 = Test in progress
   2231 = Test in progress
   2031 = Test completed
   2931 = Test failed

   For status code 2931 and all other status codes, see the *3174 Status Codes* manual.

6. To make another selection at 20HG or 29HG, press ENTER.

Table 2-11. Token-Ring Adapter Function Numbers

FN	Description	Condition
01	Cable wrap test	The Token-Ring adapter cable connected or wrap plug P/N 6165899 installed. **Note:** The Token-Ring adapter cable must be connected to the controller. The other end of the cable can either be connected or disconnected from the token ring.
02	Adapter wrap test	Wrap plug P/N 6165899 installed. Token-Ring adapter cable disconnected from the ring.
10	Display universal address	**Note:** The universal address is displayed in the following format: 4535 XXXX XXXX XXXX. The 12 X's are the universal address.

Token-Ring Adapter Function Numbers

There are three optional tests that can be performed on the Token-Ring adapter.

Cable Wrap (FN 01)

This test wraps frames through the self-shorting Token-Ring adapter cable or through the wrap plug. The test simulates the operations that take place when the adapter is connected to the ring. Before selecting this test, either connect the Token-Ring adapter cable to the adapter, or install a wrap plug (P/N 6165899).

Notes:

1. If the Token-Ring adapter cable is attached to the IBM Cabling System, the frames will wrap to the 8228 multistation access unit and back to the controller. This can be used as a problem isolation technique. If the wrap test passes with the cable disconnected from the Cabling System, but fails with the cable connected to the cabling system, the problem is not in the controller or the Token-Ring adapter cable.
2. This test runs automatically when CSU (HG 81) tests are performed.

Adapter Wrap (FN 02)

This test wraps frames at the I/O connector of the Token-Ring adapter. Before running this test, install a wrap plug (P/N 6165899). Although this test is similar to function number 01, it checks different circuitry on the Token-Ring adapter.

Display Universal Address (FN 10)

This function number is used to display the universally administered address contained on the Token-Ring adapter. This address is 12 digits long and is assigned to each Token-Ring adapter card manufactured by IBM. For the proper display of this address, this function number should only be requested when the tests are being controlled from the terminal connected to port 0. When this function number is selected, the following status code is displayed:

```
4535 xxxx xxxx xxxx
xxxx xxxx xxxx = The universally administered address
```

Token-Ring Adapter Replacement Considerations

After replacing a Token-Ring adapter if the controller fails to communicate with the token ring, addressing problems can be the cause of the failure. Each Token-Ring adapter is shipped with a unique universally administered address encoded on it. You can elect to use the universally administered address or your own locally administered addresses. The locally administered address replaces the universally administered address that is already encoded on the Token-Ring adapter card. It is recommended that you use locally administered addresses. You select a locally administered address during customizing. Use the following procedure to determine which kind of addresses you are using:

1. Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-53.
2. Go to any 3278 or equivalent terminal connected to the controller.
3. Press and hold ALT, press TEST.
4. Key in **/2,2**

   For 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R using configuration support S, examine configuration question 900.

   For a 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R using configuration support A, examine configuration question 106.

   For a 3174 Models 3R and 13R, examine configuration question 106.

   Note: These questions contain the Token-Ring adapter address.

5. If the first 2 bits of byte 0 contain 01, you are using locally administered addresses.

   Note: If your are using locally administered addresses, then addressing is not the cause of the failure unless some other device on the ring already is using the same address.

6. If the first 2 bits in byte 0 contain 00, you are using universally administered addresses. In this case the following action must be taken:

   For 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R using configuration support S, you must reconfigure the controller and enter the new universal address of the replacement Token-Ring adapter card (Question 940).

   For 3174 Models 1R, 2R, 3R, 11R, 12R, and 13R, using configuration support A, you must reconfigure the controller and enter the new universal address of the replacement Token-Ring adapter card for question 106. You must also reconfigure the controller that serves as the gateway controller for the token ring. Currently these controllers are 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R with the gateway feature, and 372X communication controllers.

7. To obtain the universal address of the replacement Token-Ring adapter card, see "How to Run Token-Ring Adapter Optional Tests" on page 2-155.

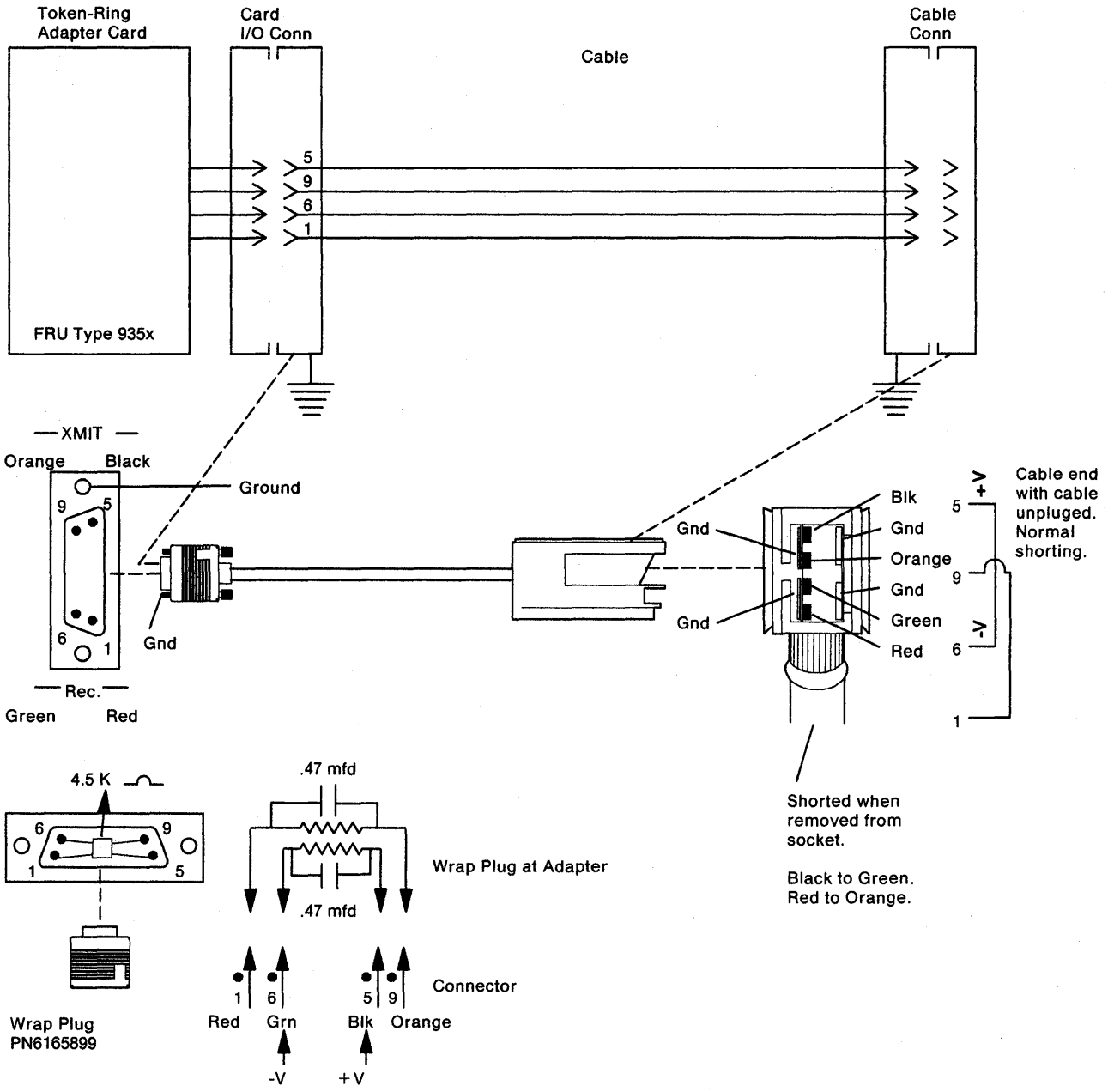


Figure 2-19. Token-Ring Adapter Line Flow (Cable and Wrap Plug)

How to Display the Test Log

This test is used to display the test log that is created when errors occur during hardware group tests. The test log can only be displayed from the 4001 prompt. If prompt 4001 is not displayed, or a test failure status code such as 29HG or 3030 is displayed, press Enter to obtain the 4001 prompt.

Note: Do not make any other test request or IML the controller as the Test Log will be reset.

1. Select a function number.

   Note: Table 2-12 and the paragraphs following "Test Log Function Number Descriptions" describe the purpose of each function number.

2. Key in **8094** where:
   80 = Load test monitor
3. Key in **01** or **06**
4. Press ENTER
5. To make another selection at 20HG, press Enter.

Table 2-12. Test Log Function Numbers

FN	Description
01	Display Test Log
06	Display Test Log Count/Time

Test Log Function Number Descriptions

The following paragraphs describe the function numbers that are used to display the test log and the test log count/time.

Note: If the test log does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the test log.

Display Test Log (FN 01): When function number 01 is selected in terminal control mode, the test log (shown in Figure 2-20 on page 2-160) that is contained in storage is displayed. This log is created when errors occur during hardware group tests. This function number is always used to display the test error log. If this function number is selected in operator panel control mode, the status codes are displayed. The other information such as pass count and elapsed time are not displayed.

Display Test Log Count/Time (FN 06): Function number 06 is used to display the test log pass count (PCNT) and elapsed time (HHMMSS) when running tests from the operator panel (FN 01 the status codes only are displayed in operator panel control).
Status code 4580 PCNT PCNT 00HH MMSS is displayed if no errors are recorded in the test log.
Status code 4581 PCNT PCNT 00HH MMSS is displayed if errors are recorded in the test log.

```
                                Test Log              PANEL 1 OF 1

TOTAL PASS COUNT 5       START TIME 15:26:57      ELAPSED TIME 01:40:03

PASS    ELAPSED TIME  STATUS CODES
 1      00:00:02      3024 0102 9110 02   9120 21

 1      00:01:12      3002 0216 9210 11   9500 18

 2      00:02:35      3024 0102 9110 02   9120 21

 2      00:03:47      3002 0216 9210 11   9500 18

 3      00:05:03      3024 0102 9112 02   9120 21

 3      00:06:15      3002 0216 9210 11   9500 18

 4      01:20:06      2987 9051 20

 5      01:22:36      2987 9051 20

 PF: 3=Quit 8=Fwd
```

Figure 2-20. Test Log

Note: The start time and elapsed time are in hours, minutes, and seconds. The elapsed time is the amount of time that the test was running until a failure occurred or the test run has completed.

How to Display the Test Monitor Functions (Terminal Control)

1. Load the test monitor. Select terminal control. See "How to Load the Test Monitor" on page 2-119.
2. Go to the terminal connected to port 0. The test menu is displayed and 4001 is displayed under the select line.

   Note: Table 2-13 and the paragraphs following "Test Monitor Function Number Descriptions" describe the purpose of each function number.
3. Select a function number.
4. At 4001, key in **80FN**

   Where:

   80 = Load test monitor
   FN = Function number
5. Press ENTER.
6. To make another selection at 2080, press ENTER.

Table 2-13. Test Monitor Function Numbers

FN	Description
02	Display Test Log – IML Drive
03	Reset Test Log – IML Drive [1]
04	Display Hardware Configuration
05	Display FRU ID Table
07	Display Test Log Count/Time IML Drive

[1]Function number 03 erases the error log contained on the diskette or fixed disk.

Test Monitor Function Number Descriptions

The following paragraphs describe the purpose of the test monitor function numbers.

Display Test Log – IML Drive (FN 02)

Function number 02; the test log (shown in Figure 2-20 on page 2-160) is displayed from the IML drive. This function number is valid only when looping a Test All diagnostic, such as HG 81, 82, or 87, and is only used when the test log is not available. See "How to Display the Test Log" on page 2-159.

Note: If the test log on the IML drive (disk/diskette) does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the test log.

Reset Test Log – IML Drive (FN 03)

Function number 03 resets the test log information contained on the IML drive. The Test Log information that is contained in machine storage is reset each time a test is selected.

Display Hardware Configuration (FN 04)

Function number 04; the Hardware Configuration Table, shown in Figure 2-21 on page 2-162, is displayed and must be selected when the diagnostics are controlled from the terminal. This panel shows all the hardware installed in the controller that generated a valid FRU ID number during an IML. The SC column in the table will contain a 32XX number only if a problem has occurred with a FRU during the IML. See the *3174 Status Codes* manual to determine what a particular status code means.

Display FRU ID Table (FN 05)

Function number 05 presents an unformatted version of the FRU ID table. This function number must be selected when the diagnostics are controlled from the terminal.

Display Test Log Count/Time IML Drive (FN 07)

Function number 07 is used to display the IML drive test pass counts (PCNT) and elapsed times (HHMMSS). Status code 4580 PCNT PCNT 00HH MMSS is displayed if no errors are recorded in the log. Status code 4581 PCNT PCNT 00HH MMSS is displayed if errors are recorded in the log. This panel shows the configuration for a Model 1R. On your machine only those FRUs that are physically installed are displayed in this table.

```
                  _____ Hardware Configuration Table _____

HG TYPE LC DESCRIPTION          SC      HG TYPE LC DESCRIPTION          SC

00 9001 00 Invalid Card/Cond            21 9540 61 AEA Cable Assembly
01 9154 21 File Adpt                    22 9333 13 Asynch Emul Adpt
01 9110 01 Diskette 1 - 1.2MB           22 9540 62 AEA Cable Assembly
02 9110 02 Diskette 2 - 1.2MB           23 9333 12 Asynch Emul Adpt
03 9132 03 Fixed Disk 1 - 20MB  32XX    23 9540 63 AEA Cable Assembly
04 9132 04 Fixed Disk 2 - 20MB          26 9154 21 Terminal Adapter
08 9500 18 Timer                        26 9172 17 Term Mpx Adpt 00-07
09 9010 05 Ops Panel Adpt               26 9172 23 Term Mpx Adpt 08-15
09 9521 06 Ops Panel Assembly           87 9053 19 Storage 2MB
11 9253 22 Type 1 Com Adpt-XXX
21 9331 14 Asynch Emul Adpt

Select Test; press ENTER ====>_

PF: 3=Quit              12=Test Menu
```

Figure 2-21. Hardware Configuration Table Example

HG = Hardware group
TYPE = FRU Type number
LC = FRU location
SC = Status code

For the communication adapters, the XXX = one of the following:

WRP = EIA/V.35 wrap plug is connected
V.35 = V.35 cable is connected
EIA = EIA cable is connected
NC = Nothing is connected
X.21 = X.21 cable is connected
WRP = X.21 wrap plug is connected
INV = An undefined cable or wrap plug is connected.

Diagnostic Aids: Online Tests

Online Tests Configuration A5/S5

Introduction

The online tests are in two sections. One set of Online Tests is for microcode that is Configuration Support A and S. The other set is for microcode that is Configuration Support B (see page 2-223). If you are not sure of your 3174 microcode release level, select online test 5, option 1 (/5,1). The release level will be displayed on the screen.

Online tests are selectable from any 3278, 3279, or similar display attached to the controller. These tests are *not* selectable from distributed function terminals, such as a 3290. This test facility can be used during normal subsystem operation and is available after entering test mode. Test mode is entered by pressing the ALT and TEST keys simultaneously on an attached display /station keyboard. The following tests can be selected by entering one of the test formats shown below or from the 3174 Test Menu shown in Figure 2-22 on page 2-166.

Test 0 (Terminal Check): Provides a facility to test a terminal's base and feature hardware. Test 0 also identifies the hardware group and port number of the terminal requesting the test. For detailed information about Test 0 see page 2-168.

/0 — Test 0 runs on the terminal being used to run tests.

Test 1 (Display Event Logs and Response Time Log): Event records for displays, printers, adapters, and processor logic are displayed. Also provides a response time monitor log. For detailed information about Test 1, see page 2-169. The following types of error logs can be displayed:

/1,1 — Response time monitor log: RTM statistics
/1,2 — All event log: Error statistics for the 3174
/1,3,n — Hardware group: Error statistics for a specific hardware group
/1,4,n — Port: Error statistics for a specific terminal port
/1,4,n,m — Port, hardware group: Error statistics for a specific terminal port of a specific hardware group
/1,5,xxxx — Status code: Error statistics for a specific status code
/1,6,n — Logical terminal: Error statistics for a specific logical terminal
/1,7 — Change log mode (Normal/Intensive).
/1,8 — Event log summary.

Test 2 (Display Configuration Panels): Provides both hardware and microcode configurations on the controller. For detailed information about Test 2, see page 2-175.

/2,1 — Hardware configuration: The hardware configuration is displayed.
/2,2 — Configuration questions: The panels presented during configure (except panel 118) are displayed.
/2,3,n — Device Definition: If the 3174 is configured for both PAM and LTA, the PAM panel will be displayed first and then the LTA panel.
/2,4 — Asynchronous Emulation Adapter configuration: The Asynchronous Emulation Adapter configuration is displayed.

Test 3 (3270 Device Status Information): The status of all terminal adapter (HG 26) attached devices is displayed. For detailed information about Test 3, see page 2-177.

/3,1 — Status Summary is displayed.
/3,2,n — Error counters for port n (n=0-31) are displayed.
/3,3,n — Connectivity for port n (n=0-31) is displayed

Test 4 (Reset Logs and Cable Errors): Resets the event log, traces, cable errors, and the response time monitor log. For detailed information about Test 4, see page 2-182.

/4,1 — Resets the response time monitor log.
/4,2 — Resets the event log, traces, and cable errors
/4,3 — Resets the cable errors.

Test 5 (Display Vital Data): Provides the following 3174 information:

Model Number
Controller ID (serial number)
Microcode functional release level
Microcode maintenance release
Installed microcode patches
Installed RPQs
DSL information.

For detailed information about Test 5, see page 2-183.

/5,1 Display Controller Vital Data
/5,2,n,m Display Port Vital Data

Test 6 (Display Control Blocks): The port control areas and host control data are displayed. Can also display all logical terminal extensions (if any). For detailed information about Test 6, see page 2-186.

/6,1,n — Register page
/6,2 — The port control area information for the requestor's port is displayed.
/6,2,n,m — The port control area information for a specific port and hardware group is displayed.
/6,3 — X.25/X.21 SHM Host Control Data

Test 7 (Color Convergence): For more information, see page 2-198.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-198.

Test 9 (Token-Ring Tests): Provides the ability to display the status of the Token-Ring network, the Token-Ring adapter status counters, and attached links. Test 9 also provides the ability to reset the Token-Ring adapter and attached link status counters. For detailed information about Test 9, see page 2-199.

/9,1 — Monitor Token-Ring status.
/9,2 — Display Token-Ring adapter status summary.
/9,3 — Reset Token-Ring adapter status counters.
/9,4 — Display link status summary for all links.
/9,5,n — Display link status summary for link address n.
/9,6 — Reset link status counters for all links.
/9,7,n — Reset link status counters for link address n.
/9,8 — Display gateway host status summary.

Test 10 (Port Wrap Tests): Provides a port wrap test for terminal adapter ports (00, 08, 16, 24), TMA ports 00—31, and 3299 Model 2 and 3 ports 00—31. For detailed information about Test 10, see 2-209.

/10,1,n — Direct wrap for a specific terminal adapter port
/10,2,n — 3299/TMA port wrap

Test 11 (Trace Control): Provides an internal trace capability. This function is available only to service personnel. For detailed information on Test 11 see "Test 11: Trace Control" on page 2-210.

Test 12 (Asynchronous Emulation Adapter Tests): Provides access to a test for an Asynchronous Emulation Adapter, port, ASCII terminal or smart-modem. It also provides a status summary and capability to reset error counters on any or all Asynchronous Emulation Adapters. For detailed information on Test 12, see page 2-213.

/12,1	–	AEA Port Tests Menu
/12,2	–	Display status summary
/12,3	–	Reset line errors on all AEA HGs
/12,3,n	–	Reset line errors on HG n.
/12,4,m,n	–	Display error counters for port m on HG n (m=0-7, n=21-23)
/12,5,m,n	–	Display connectivity for port m on HG n (m=0-7, n=21-23)

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controller. For detailed information about Test A, see page 2-220.

Test D (Dump Device): Provides a device dump capability for distributed function terminals such as a 3290. For detailed information about Test D, see page 2-222.

/D,n	–	DFT dump for port n.

3174 Test Menu

To display the 3174 Test Menu, shown in Figure 2-22, perform the following steps at any 3278 or similar display.

1. Press and hold ALT. Press TEST.
2. Press PF12, or CLEAR, or PA2.

```
                    _____ 3174 Test Menu _____

   Test        Description

    0          Terminal check
    1          Display event logs and response time log
    2          Display configuration panels
    3          3270 device status information
    4          Reset logs and cable errors
    5          Display vital data
    6          Display Control Areas
    7          Color convergence
    8          Extended functions and program symbols
    9          Token-ring tests
   10          Port wrap tests
   11          Trace control
   12          Asynchronous emulation adapter tests
    A          Alerts
    D,n        Dump device on port n (n=0-31)

Select test;  press ENTER ===>_

PF: 3=Quit
```

Figure 2-22. 3174 Test Menu

Online Test Format

The general format for all online tests is /t,s,n,m, where:

t = test number
s = option number for tests that have menus, such as test 1
n,m = value(s) required by some test menus.

For example:

A test entry of **/1,2** will display all log records.
A test entry of **/1,3,2** will display the log records for HG02.

These tests can also be selected by entering the following:

Example 1

1. From any select line, enter **/1**
   The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter **2**
   All log records are displayed.

Example 2

1. From any select line, enter **/1**
   The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter **3,2**
   The log records for HG02 are displayed.

Test 0: Terminal Check

Provides a facility to test the requesting terminal's basic functions (such as highlighting, nondisplay, and insertion), as well as feature functions (such as light pens, magnetic card readers, and scanners).

To request Test 0, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in the following:
   a. **/0** or **/**
   b. Press ENTER.
      The test pattern shown in Figure 2-23 is displayed.

```
                        ___Terminal Check___

      3174 Controller
      Hardware Group       nn
      Port Number          mm


                     ?SEL PEN              SEL PEN
                          &SEL PEN              >SEL PEN
                     NON DISPLAY             INSERT CK




   To go directly to other tests, enter:  /Test,Option
   Select test;  press ENTER ====> __

PF:   3=Quit                            12=Test menu
```

WHERE:

nn = The adapter HG number of the terminal that requested the test.
mm = The port number of the terminal that requested the test.
NON = The nondisplay field that should not appear on the screen.

Figure 2-23. Test 0 Display Pattern

The following terminal functions are tested:

- High-intensity function
- Nondisplay function
- Selector pen (if one is attached)
- Various key functions and modes
- Four-color function and base-color switch capability on a 3279 or similar color display station
- Audible alarm (if one is attached).

Test 1: Display Logs Menu

Test 1 provides a response time log and event statistics for terminals, hardware groups, and ports. To select a specific event log from the Logs Menu, shown in Figure 2-24, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/1**
3. Press ENTER; the Logs Menu is displayed.
4. To display a specific event log, type in the option number of the desired log and press ENTER.

```
                          _____ Logs Menu _____

Option      Description            (Current log mode:  Normal )

  1         Response time log
  2         All events logged
  3,n       Hardware group (n=0-99)
  4,n       Port n (n=0-31)
  4,n,m     Port n, hardware group m (n=0-31,m=0-99)
  5,xxxx    Status code (replace x's with search digits)
  6,n       Logical terminal (n=0-254)
  7         Change log mode (normal/intensive)
  8         Event log summary (by category and hardware group)


To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _


PF:  3=Quit                                  12=Test menu
```

For Models 1L through 13R, valid terminal adapter port numbers are 0 to 31.
For Models 51R through 63R, valid terminal adapter port numbers are 0 to 15.
For Models 81R through 92R, valid terminal adapter port numbers are 0 to 7.

Figure 2-24. Test 1 Menu

Option 1. Type **1** to select option 1 from the Logs Menu. The resulting panel shows the response time monitor (RTM) log if the controller is configured for RTM.

Option 2 – 6. Similar panels are displayed when options 2, 3, 4, 5, or 6 are selected from the Logs Menu. The difference in the format of the log record panels is the title line. Each panel contains the menu selection and the specified parameter value. If no event record exists for the requested event log, a `No entries were found` message is displayed. To select a log record from the Logs Menu, enter one of the following test requests:

2 All the errors in the event log are displayed.
3,n (n = a specific hardware group number from 0 to 99) All errors in the event log for the hardware group selected are displayed.
4,n (n = a specific terminal port number from 0 to 31) all errors in the event log for the port number selected are displayed.
4,n,m (n = a specific terminal port number from 0 to 31; m = a specific hardware group number from 0 to 99) all errors in the event log for the port number on the specific hardware group selected are displayed.

5,xxxx (the x's are replaced with a status code). Four characters must be entered. An x can be used as a "don't care" character. For example: On the select line on the Logs Menu panel, enter **5,x501**. The event log will be searched, and all the 501 status codes that occurred since the last time the logs were reset will be displayed.
6,n (n = a specific logical terminal number from 0 to 254) all errors in the event log for the logical terminal number that was selected are displayed.

Option 7. Type **7** to change the log mode from **Normal** to **Intensive** and from Intensive back to Normal. The current log mode is noted on the Test 1 Menu screen. Normal is the mode regularly used for logging errors. Intensive was created to record those high-frequency loggable errors that are not recorded in Normal mode. Because of the high frequency of the errors, Intensive mode should only be used when needed. To guard against continued use, the controller will change the log mode back to Normal when a 76-hour timer expires.

Option 8. Type an **8** the Event Log Summary is displayed. It provides a single panel of error log summary information available through the /1 test in 3174 online TEST MODE. All current log records, both internal and on diskette or fixed disk, are divided into the following event categories. A breakdown by Hardware Group (HG) is under each category. See Figure 2-25.

```
                        _____ Event Log Summary _____

 Category   Machine    Program    Comm    Media    Port    Other
            Check      Check      Check   Check    Check

 Total          2          1        2       6        4       12

 Subtotal
 by         HG         HG       HG      HG       HG      HG
            26  1      00  1    16  2   02   2   26   4  02   2
            00  1                       99   3           26  10
                                        01   1


To go directly to other tests, enter:  /Test,Option
Select test:  press ENTER ===>_

 PF: 3=Quit            12=Test menu
```

Figure 2-25. Event Log Summary (Example)

Log Records Example:

Figure 2-26 illustrates the panel displayed if you select option 4 with a specific port number and hardware group.

```
                    _____ Log Records - All _____

(Day/Time since last POR: 000/08:11)
Day Time   SC    QA  PHG_PN   CHG_PN  LT    Extended data bytes (B1-B16)
                                           B1   B3   B5   B7   B9   B11  B13  B15
000 08:11  0315  58  16                     9210 1100 01
000 00:05  0384  05  99                     0387 0385
000 00:03  0500  01  16
000 00:02  0503  01  16
000 00:02  3174  01  00
015 21:48  0402  02  16       26_02    002   0000 0003 F350 0000
015 21:22  0401  03  16       26_02    006   0001 0004 3c40 4000
015 21:20  0209  51  26_08    16       008
015 21:19  0201  51  26_08    16       008
015 21:07  3174  01  00
015 20:01  0311  01  87                     9052 1900

SC=Status Code    QA=Qualifier   HG=Hardware group       PN=Port number
PHG_PN=PrimaryHG_PN      CHG_PN=ConnectingHG_PN      LT=Logical terminal
ID=Host ID

To go directly to other tests, enter: /Test,Option
Select test; press ENTER====>_

PF: 3=Quit              8=Fwd          12=Test Menu
```

Figure 2-26. Log Record Display Panel

Day/Time

The Day/Time value indicates the setting of the 3174 interval timer when the request to display the log is entered. Since the interval timer is reset to zeros when the controller is powered off and on, it also indicates the elapsed time since the power-on occurred. This timer can be set to the actual time of day using an offline test. The day value range is 000 to 255 and is increased by 1 every 24 hours. The time field is specified as 00 hours through 23 and 00 minutes through 59.

The Day/Time represents the day and time with respect to power-on when the log event occurred.

SC Field

SC = The base status code that was logged. See the *3174 Status Codes*, GA27-3832, for the recovery action.

QA Field

QA = The qualifier associated with the base status code.

PHG and CHG Fields

PHG (Primary Hardware Group) and CHG (Connection Hardware Group) = The hardware group associated with the error that occurred. The PHG field contains 00 or 99 if the error is not associated with a particular hardware group, or if the hardware group cannot be identified. The values 00 and 99 are not displayed in the CHG field. An example of this would be a 3278 terminal attached to a TMA in a 3174 Model 1L or 11L.

The PHG would be HG26 and the CHG would be HG16. The hardware groups for all models of the 3174 are shown in Table 2-14.

Table 2-14. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	22	Asynchronous Emulation Adapter
01	Diskette Drive 1/File Adapter	23	Asynchronous Emulation Adapter
02	Diskette Drive 2/File Adapter	26	Terminal Adapters
03	Fixed Disk 1/File Adapter	26	Terminal Multiplexer Adapters
04	Fixed Disk 2/File Adapter	31	Token-Ring Adapter
08	Timer	46	Encrypt/Decrypt Adapter
09	Operator Panel	80	Test Monitor
11	Communication Adapter	81	Test All CSU Mode
16	Channel Adapter	82	Test All Installed Mode
16	Channel Driver/Receiver	87	Processor/Storage
21	Asynchronous Emulation Adapter	99	Unassigned Hardware Group

PN Field

PN = The port number (PN) is used in conjunction with the PHG and CHG fields in the Log Records menu. This field is not displayed at the operator panel.

The Hardware Group 26 port numbers for the 3174 Models 1L through 13R range from 0 to 31. The Hardware Group 26 port numbers for 3174 Models 51R through 63R range from 0 to 15. The Hardware Group 26 port numbers for 3174 Models 81R through 92R range from 0 to 7.

LT Field

LT = The logical terminal number, if the error is related to attached terminals. The LT field is not displayed at the operator panel. Certain terminals may use multiple logical terminals, such as a 3290.

Extended Data Fields (B1—B16)

The extended data fields contain supplementary information that may be useful to resolve a problem, such as TYPE and LOCA of the failing FRU, or the failing bytes in a data stream error. To determine the definition of the extended data (B1 – B16), see the *3174 Status Codes*, GA27-3832. The extended data field in the *3174 Status Codes* correlates to this field. See the following example on how to correlate a log entry to the *3174 Status Codes*: Log Entry = 0504 0511 00 9253 22

0504 = Status code
0511 = Qualifier and hardware group
00 = PN (none associated with this log entry)
9253 = FRU Type number
22 = Location of the FRU

To find this status code in the *3174 Status Codes*, look for status code 0504 with a QA field of 05.

Status Code Entry = 0504 05HG B1B2 B3B4

0504 = Status code
05HG = Qualifier and hardware group
B1B2 = FRU Type Number
B3B4 = Location of the FRU

Test 1, Option 1

If the 3174 has been configured for local display of the RTM log or the host has enabled this function, the /1,1 Test allows an operator to display the RTM log on authorized displays (except terminals such as the 3290). An example of the Response Time Monitor log is shown in Figure 2-27 on page 2-173.

```
                                @ = nnn


 /1,1
@   DEF  CTR#1  BDY#1  CTR#2  BDY#2  CTR#3  BDY#3  CTR#4   BDY#4      OV
00   1      10    0.5 11,415    1.0    316    5.0     21  1:00.0       6
01p  1       0    0.5      0    1.0      0    5.0      0  1:00.0       0
02 ? 1     651    0.5      0    1.0      0    5.0      0  1:00.0  14,458
03  *2     251    0.5    512    1.0     56    5.0      0  1:00.0       1
04i  1 *    31    1.0     11    2.0  4,371    5.0      4    .1.0       2
05_  1       0    0.5      0    1.0      0    5.0      0  1:00.0       0
06  *3       1    1.0     61    2.0      4    3.0      0     4.0      45
07p  1   1,415    0.5    890    1.0    323    5.0      0  1:00.0   1,381




PF: 3=Quit              8=Fwd                    12=Test menu
```

Figure 2-27. RTM Log

The example shows representative information for the first eight logical terminals. If the 3174 is not customized for RTM, the display station keyboard is inhibited. Each time the PF8 key is pressed, the next group of eight terminals is displayed.

@ = Device or logical unit (LU)
p = Printer (no RTM statistics)
i = Distributed function terminal
_ = Never powered up (no RTM statistics)
* = Parameter set by host
? = RTM disabled by host for this device
DEF = Response Time Definition
  1 = the time to the first character written on the terminal.
  2 = the time to keyboard is usable by the operator.
  3 = the time to CD/EB.
CTR#1 = First-counter response time = 0 up to BDY 1 value
CTR#2 = Second-counter response time greater than BDY 1 up to BDY 2 value
CTR#3 = Third-counter response time greater than BDY 2 up to BDY 3 value
CTR#4 = Fourth-counter response time greater than BDY 3 up to BDY 4 value
BDY 1 = First boundary in minutes and seconds
BDY 2 = Second boundary in minutes and seconds
BDY 3 = Third boundary in minutes and seconds
BDY 4 = Fourth boundary in minutes and seconds
OV = Overflow (response time exceeding last boundary).

Note: The displayed boundaries are rounded to the nearest tenth of a second.

Reset the Response Time Monitor

The operator at an authorized display can reset the RTM logs of all configured devices. All log information is reset except the customized boundaries, the customized RTM definitions, and pending transaction status. See "Test 4: Reset Logs and Cable Errors" on page 2-182. When the reset is completed, a completion message appears on line 23.

If the 3174 is not customized for RTM, when **/4,1** is entered, a message appears stating the function is not supported for this configuration.

Test 2: Configuration Menu

Test 2 provides information about hardware configuration, configuration questions, the printer authorization matrix, and the Asynchronous Emulation adapter configuration. When Test 2 is selected, the menu shown in Figure 2-28 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/2**
3. Press ENTER; the Configuration Menu is displayed.
4. Type in the option number.
5. Press ENTER.

```
                    _____ Configuration Menu _____

Option        Description


  1           Hardware configuration
  2           Configuration questions
  3,n         Printer authorization matrix for entry n (n=1-47)
  4           Asynchronous Emulation Adapter configuration




To go directly to other tests, enter:  /Test,Option
Select Option, press ENTER ====> __

PF:  3=Quit                          12=Test menu
```

Figure 2-28. Test 2 Menu

Option 1. The Hardware Configuration Table is displayed.

Option 2. The configuration panels displayed during configuration (except panel 118) are displayed.

Option 3,n. The printer authorization matrix for all printers attached to the controller, starting with the one you specified with the "n" parameter are displayed.

Option 4. The asynchronous emulation adapter configuration panels are displayed.

For more information about Options 2, 3, and 4, see the *3174 Utilities Guide*, GA23-0214.

Test 2, Option 1

The following panel is displayed.

```
                 _____Hardware Configuration Table_____


HG TYPE LC DESCRIPTION          SC      HG TYPE LC DESCRIPTION        SC
00 9001 00 Invalid Card/Cond            21 9540 61 AEA Cable Assembly
01 9110 01 Diskette 1 - 1.2MB           22 9540 62 AEA Cable Assembly
02 9110 02 Diskette 2 - 1.2MB           22 9333 13 Asynch Emul Adpt
03 9132 03 Fixed Disk 1 - 20MB  32XX    23 9333 12 Asynch Emul Adpt
04 9132 04 Fixed Disk 2 - 20MB          23 9540 63 AEA Cable Assembly
08 9500 18 Timer                        26 9154 21 Terminal Adapter
09 9010 05 Ops Panel Adpt               26 9172 12 Term Mpx Adpt 24-31
09 9521 06 Ops Panel Assembly           26 9172 16 Term Mpx Adpt 08-15
11 9253 22 Type 1 Com Adpt-XXX          31 9350 12 Token-Ring Adpt 4Mbps
16 9210 11 Channel Adpt                 87 9053 19 Storage 2MB
16 9230 10 Channel Drv/Rcvr
21 9333 14 Asynch Emul Adpt

Select Test; press ENTER ====>_

PF: 3=Quit                12=Test Menu
```

Where:

HG = Hardware group
TYPE = FRU Type number
LC = FRU location
SC = Status code This field contains a 32XX number only if a problem has occurred with a FRU during an IML.

Note: This table shows the configuration for Model 1L. Only those FRUs that are physically installed are displayed in this table.

For the communication adapters, the XXX = one of the following:

WRP = EIA/V.35 wrap plug is connected
V.35 = V.35 cable is connected
EIA = EIA cable is connected
NC = Nothing is connected
X.21 = X.21 cable is connected
WRP = X.21 wrap plug is connected
INV = An undefined cable or wrap plug is connected.

Figure 2-29. Hardware Configuration Table

Test 3: 3270 Device Status Information

Test 3 provides the status of all configured devices. The 3270 Device Status Menu panel shown in Figure 2-30 is displayed. The Control diskette must be installed and a normal IML has to be completed before this test can be selected. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type **/3**
3. Press ENTER.

```
                    _____ 3270 Device Status Menu _____

  Option        Description

    1           Display status summary
    2,n         Display error counters for port n (n=0-31)
    3,n         Display connectivity for port n (n=0-31)




To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===>_


PF:  3=Quit                      12=Test menu
```

Figure 2-30. 3270 Device Status Menu

Test 3, Option 1

The following panel is displayed.

```
                    _____Status Summary - HG 26_____

Port     00  02  04  06  08  10  12  14  16  18  20  22  24  26  28  30
Address    01  03  05  07  09  11  13  15  17  19  21  23  25  27  29  31

Attach   m m m m m m m m d               x M M M M M M M m m m m m m m m
Status   1 1 1 1 0 0 1 0 1 0 0 0 0 0 0 0 0 - - 1 0 s 1 1 0 1 0 0 1 0 0 1
Terminal v v v v ? v v v p                 p p v v v v v v v v i i v v v
Cable    . . . . . . : . .                 . . . | . . . . . . . . . . .
Cable Max. . . . . * : . .                 . . : * . . : . . . .   : : *
Host     3 3 3 A     3 A 3                    3   3   x x 3     3
LU       + + +       +   +                    +           +     +

  d = direct      - = off(error)       i = DFT device     . = 0 errors
  m = multiplexor x = unconfigured     ? = unknown        : = 1-5 err
  1 = on          p = printer          + = in session     | = 6-15 err
  0 = off         v = video display    3=3270  A=ASCII    * = > 15 err
                  s = switched

Connection number:  Outgoing call 999-555-1234

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF:  3=Quit                                   12=Test menu
```

Figure 2-31. Status Summary

Port Address: indicates the terminal port number.

For Models 1L through 13R, ports 00 – 31 are displayed.
For Models 51R through 62R, ports 00 – 15 are displayed.
For Models 81R through 92R, ports 00 – 07 are displayed.

Attach:

d	=	The terminal is attached directly to the terminal adapter.
m	=	The terminal is attached through a 3299 Terminal Multiplexer.
M	=	A terminal that is attached to this controller through a 7232 dual control unit terminal multiplexer.
x	=	A terminal that is configured only for another controller through a 7232 dual control unit terminal multiplexer. That terminal will not communicate with this 3174.
?	=	When displayed on this line under port 00, a question mark (?) means one of the following:

- The controller has not communicated with a directly attached terminal.
- The controller has not communicated with any of the terminals connected to a 3299.

Status: Indicates one of the following conditions on the configured terminals at the time the test request was entered:

1	=	The attached terminal is communicating with the 3174.
0	=	The attached terminal is powered off or disconnected.
-	=	The terminal had been communicating with the 3174, but the terminal is now disabled from the controller because of errors. Run Test 1, Option 4 (Event Log) and check for any 2XX status codes logged against the port number that was disabled.
s	=	The terminal is presently communicating with another controller through a 7232 dual control unit terminal multiplexer, in other words, it is in the switched state.

Terminal: Indicates the type of device connected.

?	=	The device attached to this port has not been communicating with the 3174. The terminal on this port may not have been powered on. To reset this condition at the terminal: Set the Normal/Test switch to Test and back again, or perform a power-on reset.
v, p, or i	=	The display or video (v), printer (p), or DFT device (i) for this port has a known history of communicating with the 3174.

Note: If a terminal or multiplexer cable is disconnected and then reconnected, a terminal power-on reset is required to allow the 3174 to recognize the change. The terminal counter is reset by an IML, by a power-on reset on the attached terminal, or by online test 4.

Cable: Terminal errors that are caused by cable media-related problems are counted by the cable counter for each port address. The cable counters accumulate the number of cable transmission errors occurring in the most recent 30-minute time period. Every 30 minutes the cable counters are reset to 0 and error counting starts again. When any cable counter passes the threshold of 16 errors, status code 201 51 is recorded in the event log. The event log can be viewed to determine the number of cable errors that have occurred over an extended period of time. This log is displayed by using online test /1. The cable counters are also reset by an IML and online test /4 options 2 and 3. Individual cable counters are reset when the attached terminal is powered on.

Cable Max: The Cable Max counters retain the peak value attained by the Cable Threshold counters over an extended period. They are not reset every 30 minutes, but only are reset by IML and online test /4 options 2 and 3.

Host: This line represents the type of host to which a terminal is currently connected, or if no host is configured. For ports configured for Multiple Logical Terminals (MLT), a blank, 3, or A represents the primary logical terminal session only.

Blank	=	No current host
x	=	No host sessions configured
3	=	3270 host connection established
A	=	ASCII host connection established.

LU: This line is present only for 3174s running SNA. It indicates whether the SNA session is bound and active. For MLT ports, the + is displayed if any SNA session is active.

Connection Number: This number is for X.21 or X.25 lines. One of the following messages can follow the connection number:

Outgoing Call, followed by the number being called. For X.25, the outgoing call number (or host DTE address) can be up to 15 digits long. For X.21, the outgoing call number can be up to 32 characters long, as entered on the dial terminal.

Direct Call (X.21 only).

Incoming Call followed by an optional number. For X.25, the Incoming Call or Host DTE Address can be up to 15 digits long. For X.21, the Incoming Call will be displayed.

Test 3, Option 2

The following panel is an example of the error counters for the port specified by the parameters.

```
              ___Error Counters for PN 02, HG 26___

Adapter (HG) status:           Disabled
Port (PN) status:              Powered off due to error
Error counters-

  Poll time out:     10
  Read time out:     10
  Poll parity:       10
  Read parity:       10
  Coax threshold:    40
  Max threshold:     75



To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-32. Error Counters Example: Disabled Adapter and Disabled Port

Test 3, Option 3

The following panels are examples of connectivity. The status of the device determines which panel is displayed.

```
                _____Connectivity for PN 11, HG 26_____

Adapter (HG) status:            Enabled
Port (PN) status:               Powered on
Device Type                     Video display (MLT)

Current connectivity-

       LT    LT Addr            HG_PN   Host/Station Name

      (No host connectivity configured)




To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-33. Connectivity Example: Enabled Adapter and Host Unconfigured

```
                _____Connectivity for PN 11, HG 26_____

Adapter (HG) status:            Enabled
Port (PN) status:               Powered on
Device Type                     Video display (MLT)

Current connectivity-

       LT    LT Addr         HG_PN      Host/Station Name
       1      111            11         3270 host
       2      n/a            21_02      DOW JONES
Active 3      n/a            22_07      THE SOURCE
       4                                    not connected
       5      100            11         3270 host

To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-34. Connectivity Example: Enabled Adapter and Live MLT Display

Test 4: Reset Logs and Cable Errors

Test 4 resets the response time logs, the event logs, traces, and cable errors. The menu shown in Figure 2-35 is displayed.

Warning: Do not select the options on this menu unless you want to reset all of your counters back to **zero**.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/4**
3. Press ENTER.

```
                        ____Reset Log Menu____

   Option         Description

     1            Reset response time logs
     2            Reset event log, traces, and cable errors
     3            Reset cable errors









To go directly to other tests, enter:  /Test,Option
Select option;  press ENTER ====> __

PF:  3=Quit                             12=Test menu
```

Figure 2-35. Test 4 Menu

Option 1. Select option 1 on the Reset Log Menu to reset the response time log.
Option 2. Select option 2 on the Reset Log Menu to reset the event logs, traces, and cable errors.
Option 3. Select option 3 on the Reset Log Menu to reset only the cable errors.

Notes:

1. Cable errors can be reset on an individual port by performing a power-on reset on the terminal connected to that port.
2. To reset line errors on ASCII terminals, use Test 12, Option 3 or 4.

Test 5: Display Vital Data

Test 5: Controller information such as model number, serial number, and EC level is displayed. The menu shown in Figure 2-36 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/5**
3. Press ENTER.

```
                          _____ Vital Data Menu _____

Option       Description

1            Controller Vital Data
2,n,m        Port n vital data on HG m (n=0-31, m=21-23, 26)









To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Figure 2-36. Vital Data Menu

Option 1. Select option 1 on the Vital Data Menu to display the Controller Vital Data panel. See Figure 2-37 on page 2-184.

Option 2. Select Option 2 to display the Port Vital Data panel. See Figure 2-38 on page 2-185.

Test 5, Option 1

The following panel is displayed.

```
                    ____Controller Vital Data____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:          01R       Active                    Active
Controller ID:         1234567   Patches                   RPQs
Microcode Release:     A5.0
Maintenance Release:   89186     123456  112361  112371   8K125
IML Drive/Type:        01/41     112344  112362  012372   7L123

DSL Information:                 112345  112373  112373   8K123
3290 01.02 0000000000            002222  012364  112374   8K123
3179 01.00 0000000000            112355  112365  112375   8K123
9999 01.00 0000000000            112356  002366  002376   8K123
9998 01.00 0000000000            012357  112367  112377   8K124

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Figure 2-37. Controller Vital Data

Note: If more than 30 patches are installed on the Control disk, PF8 = FWD will be displayed on this panel.

Help ## – This number is assigned by the customer in response to question 99 during customizing.

Model Number – The model number of the controller.

Controller ID – This ID is assigned by the customer in response to question 108 during customizing.

Microcode Release – This is the configuration support release and suffix level of the Control disk. A is the configuration support, 5 is the release level, and 0 is the suffix.

Maintenance Release – This is the year and Julian date that the microcode was released. 89 is the year, and 186 is the day in the year.

IML Drive/Type – This is the drive and the type of IML that was performed.

Drive Type

01 = Diskette drive 1
02 = Diskette drive 2
03 = Fixed disk drive 1
04 = Fixed disk drive 2.

IML Type

41 = Load production (default) operational microcode
42 = Load back level operational microcode
43 = Load trial operational microcode.

Active Patches – These are the patch ids that can be in effect for the current system configuration. Even though listed, a patch is only active if the configuration of the system allows the patch to function. A listed patch is not necessarily functional.

Active RPQs – These are the active RPQ ids that are in effect for the current system. Blank entries indicate no active RPQs.

DSL Information – This information describes one DFT device on each line. The terminal model type comes first, followed by the release level and suffix for the DFT microcode. The DFT RPQ is the last field. The syntax (the parentheses do not appear) is:
(Configuration level)(Release level)(Suffix level)(DFT RPQ)

Test 5, Option 2

Type **2,n,m** (n = port number, m = HG 21, 22, 23, or 26). The following panel is displayed.

```
                 _____Port Vital Data-PN 02, HG 26_____

Device Type:              3179
Model number:             G
Plant of manufacture:     *
Serial number:            *
Release level:            *
Engineering change date:  *
                                    B1 B2 B3 B4 B5 B6 B7 B8
Device characteristics (hexadecimal):  03 1F 80

* = data not supplied by device


To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _


PF: 3=Quit                                  12=Test menu
```

Figure 2-38. Port Vital Data

Test 6: Display Control Blocks

Test 6 provides the following information. Option 2 Port Control Area contains common subsystem information pertaining to all terminals and devices, and the Host Control Data (Option 3) contains information on the host adapter. In addition, limited device feature information is provided. Options 2 and 3 represent the most current information about a specific device, and should be checked when it is necessary to determine specific device parameters, such as:

- Type and feature information for attached terminals.
- Is the display screen size correctly specified?
- Is a modified data tag (MDT) bit set?
- The type of keyboard for a specific terminal.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/6**
3. Press ENTER.

```
                    _____Display Control Blocks Menu_____

Option          Description

  1,n           Register page n (n=0-3F)
  2             Port control area (Requestor's Port)
  2,n,m         Port n control area on HG m (n=0-31 m=21-23,26)
  3             X.21 SHM / X.25 Host Control Data









To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _

PF:  3=Quit                                    12=Test menu
```

Figure 2-39. Test 6 Menu

Option 1,n Register page n (n = 0—3F).

Option 2 Port control area for the requesting terminal is displayed.

Option 2,n,m. Select option 2,n,m to display the port control area for the terminal on port n of hardware group m.

An example of the Port Control Area panel is shown in Figure 2-40 on page 2-187. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-41 on page 2-188 for an example of an LT Control Area panel.

Option 3. Select option 3 on the Display Control Blocks Menu to display the host control data on controller that are configured for X.21 or X.25. Figure 2-42 on page 2-194 shows the host control data for X.21 short-hold mode. Figure 2-43 on page 2-196 shows the host control data for X.25.

Note: This option only shows the correct XIDs sent and received during an X.21 short-hold mode session. XIDs exchanged before an SHM session is established are not included in the host control data.

Test 6, Option 2

The following panel will display information about your terminal.

```
                    ____Port Control Area - PN 17, HG 26____

     0     2     4     6     8     A     C     E
00   1111  2222  3333  4444  1111  2222  3333  4444
10   0000  1234  1234  1234  1234  1234  1234  1234
20   1234  1234  1234  1234  1234  1234  1234  1234
30   1234  1234  1234  1234  1234  1234  1234  1234
40   1234  1234  1234  1234  1234  1234  1234  1234
50   1111  2222  3333  4444  1111  2222  3333  4444
60   0000  1234  1234  1234  1234  1234  1234  1234
70   1234  1234  1234  1234  1234  1234  1234  1234
80   1234  1234  1234  1234  1234  1234  1234  1234
90   1234  1234  1234  1234  1234  1234  1234  1234
A0   1234  1234  1234  1234  1234  1234  1234  1234
B0   1111  2222  3333  4444  1111  2222  3333  4444
C0   1111  1234  1234  1234  3333  1234  1234  1234
D0   1234  1234  1234  1234  1234  1234  1234  1234
E0   0000  2222  3333  4444  1111  2222  2222  3333
F0   1234  1234  1234  1234  1243  1234  1234  1234

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit            8=Fwd              12=Test menu
```

Figure 2-40. Port Control Area Panel

Note: To analyze the information contained on this panel, see "Port Control Area Bit Definitions" on page 2-189.

Type **2,n,m**

The following panel will display information for the logical terminal specified by the parameter values.

```
                ____LT n Control Area - PN 17, HG 26____

Segment mm

     0     2     4     6     8     A     C     E
00   1111  2222  3333  4444  1111  2222  3333  4444
10   0000  1234  1234  1234  1234  1234  1234  1234
20   1234  1234  1234  1234  1234  1234  1234  1234
30   1234  1234  1234  1234  1234  1234  1234  1234
40   1234  1234  1234  1234  1234  1234  1234  1234
50   1111  2222  3333  4444  1111  2222  3333  4444
60   0000  1234  1234  1234  1234  1234  1234  1234
70   1234  1234  1234  1234  1234  1234  1234  1234
80   1234  1234  1234  1234  1234  1234  1234  1234
90   1234  1234  1234  1234  1234  1234  1234  1234
A0   1234  1234  1234  1234  1234  1234  1234  1234
B0   1111  2222  3333  4444  1111  2222  3333  4444
C0   0000  1234  1234  1234  1234  1234  1234  1234
D0   1234  1234  1234  1234  1234  1234  1234  1234
E0   1234  1234  1234  1234  1234  1234  1234  1234
F0   1234  1234  1234  1234  1234  1234  1234  1234

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit      7=Back      8=Fwd            12=Test menu
```

Figure 2-41. LT Control Area Panel

Where:

n	=	blank, non-MLT device
n	=	1—5, logical terminal number of the MLT device for which the data on the panel applies
mm	=	segment number of the current panel.

Note: To analyze the information contained on this panel, see "LT Control Area Bit Definitions" on page 2-191.

Port Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bits are assumed to be set to B'1' unless otherwise noted.

Table 2-15 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 4	0–1	Reserved
	2	Op Complete pending from device
	3	Selector Pen retry processing
	4	Stacked status/keystroke/error
	5–6	Reserved
	7	Print ID entry mode
Byte 05	0	Attached to a 7232 dual control unit terminal multiplexer
	1	Attached to a 7232 dual control unit terminal multiplexer - switched to other CU
	2–5	Reserved
	6	Reserved
	7	Port timer enabled
Byte 06	0–2	Reserved
	3	Reserved
	4	APL ROS installed
	5–6	Number of PS Sets 00 = 0 01 = 2 10 = 4 11 = 6
	7	Color device
Byte 07[1]	0	Printer
	1	CUT display
	2	DFT device
	3	MLT device
	4	Reserved
	5	Reserved
	6	Display HAP
	7	Reserved
Byte 08	0	1 = 3278 mode 0 = Native mode
	1	1 = Numeric lock 0 = No numeric lock
	2	1 = Keyboard functions have been redefined 0 = No modifiable keyboard-Keyboard functions have not been redefined
	3–7	Modifications keyboard ID Bit 2–0 Bit 2–1 00000 Reserved Reserved 00001 Typewriter A 00010 Data Entry 1 B 00011 APL C 0100 Reserved D through 11111
Byte 09[1] (Display)	0–3	0000 - Reserved 0001 - APL keyboard/numeric lock 0010 - Text keyboard/numeric lock 0011 - RPQ typewriter keyboard/numeric lock

[1]Actual features identified to the 3174 by the terminal.

Table 2-15 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
		0100 - Typewriter Attribute Select keyboard/numeric lock 0101 - APL keyboard 0110 - Text keyboard 0111 - APL Attribute Select keyboard 1000 - Data Entry 2 keyboard/numeric lock 1001 - Data Entry keyboard/numeric lock 1010 - Typewriter/numeric lock 1011 - Reserved 1100 - Data Entry 2 keyboard 1101 - Data Entry 1 keyboard 1110 - Typewriter 1111 - No keyboard
	4–6	001 - Model 1 010 - Model 2 011 - Model 3 100 - Escape 101 - Reserved 110 - Model 5 111 - Model 4
	7	0 - indicates display byte
Byte 09[1] (Printer	0	ECS feature present
	1	APL feature present
	2	Reserved
	3	Reserved
	4–6	001 - Model 1 010 - Model 2 011 - Model 3 100 - Reserved 101 - Reserved 110 - Model 5 111 - Model 4
	7	1 - Indicates printer byte
Byte 0A[1] (Display)	0	Reserved
	1	Security key
	2	Selector light pen
	3	Reserved
	4	Magnetic slot reader
	5	Reserved
	6	Extended function buffer
	7	ECS adapter
Byte 0B[1]	0–2	Reserved
	3	Color
	4	Display HAP present
	5–7	Reserved
Byte 0F		Port Number 00–1F = TA ports 0–31 20–27 = AEA 1 ports 0–7 28–2F = AEA 2 ports 0–7 30–37 = AEA 3 ports 0–7
Bytes 18–1B.		Device Type in EBCDIC (F0F0F0F0 if not known)

[1]Actual features identified to the 3174 by the terminal.

Table 2-15 (Page 2 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 1C		Additional Information (00 If not known)
	0–3	= E = Programmable device = 1 = Hardware or Microcode product
	4–7	= 1 = IBM Product = 9 = Non-IBM Product
Bytes 1D–1F		Model in EBCDIC (000000if not known)
Bytes 20–21		Plant of Manufacture in EBCDIC (0000 if not known)
Bytes 22–28		Serial number in EBCDIC (00000000000000 if not known)
Bytes 29–2B		Release level in EBCDIC (0000000 if not known)
Bytes 2C–3B		Addition level information (00.....00 if not known)
Byte 3C		2NN
Byte 3D		3NN
Byte 85	0–3	Reserved
	4	Monocase switch active in device
	5	Clicker enabled
	6	CECP Enabled
	7	Device CECP capable
Byte 86		Number of sessions configured for a port
Byte 8C	1	Multiple display sessions on display
Byte 8D	0	Reserved
	1	VPD Support
	2–6	Reserved
	7	0 = Converged keyboard present 1 = Enhanced keyboard present
Byte 93	5	Shared mode printer
	6	Local mode printer
	7	System mode printer
Byte EC	0	ASCII connection for ASCII terminal or ASCII printer available
	1	ASCII host connection valid on this port
	2	AEA port configured as switched
	3–4	Reserved
	5	AEA line trace running

[1]Actual features identified to the 3174 by the terminal.

LT Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bytes 04 and 06 indicate functions supported by the controller and reported as available by the device.

Table 2-16 (Page 1 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 04	0–2	Value Model Buffer Size 000 - Reserved 001 1 960 (480) 010 2 1920(1920) 011 3 2560 (1920) 100 - Reserved 101 - Reserved 110 5 3564 (1920) 111 4 3440 (1920)
	3	0=Display 1=Non-Display
	3–4	11 Printer 01 Data Entry Display 10 None of the others 00 Typewriter Display
	4	0=Escape 1=Printer
	5	SOEMI printer present
	5–7	BREG printer present
Byte 05	0	Katakana keyboard attached
	1	SCS feature installed on printer
	2	Text keyboard
	3	3289 text feature
	4	APL keyboard
	5	Extended keyboard function
	6	Printer supports extended LU1 data stream with SNA FM headers
	7	DFT session
Byte 06	0	Not used
	1	Security keylock present
	2	Selector pen attached
	3	Reserved
	4	MSR/MHS attached
	5	Reserved
	6	3180 in model 6,7,8, or 9 mode
	7	ECS (APL/Text)
Byte 07[1]	0-2	Reserved
	3	Color
	4	Display HAP Supported
	5-7	Reserved
Byte 08	0	Reserved for engineering use
	1	Device to CU connection active
	2-5	Reserved
	6	Numeric lock field
	7	Reserved for engineering use
Byte 09	0	Protected field or attribute character
	1–4	Reserved for engineering use
	5	Keyboard inhibited
	6	Reserved for engineering use
	7	Insert mode

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-16 (Page 1 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 0A	0	Reserved
	1	Test mode
	2	Alpha shift (not Katakana shift)
	3	Reserved for engineering use
	4	Text indicator
	5	Upshift indicator
	6	Katakana shift
	7	APL indicator
Byte 0B	0	Online indicator
	1	System wait condition
	2	Hard lock condition
	3	Keyboard in use by operator
	4–7	Reserved for engineering use
Byte 0D	0	Reserved for engineering use
	1	Color override
	2	Reserved for engineering use
	3	Host-initiated local copy request
	4	Alternate screen size
	5	Attributes not valid
	6	Reserved for engineering use
	7	X.21/X.25 Primary dial terminal
Byte 0E	0–1	Reserved for engineering use
	2	Print failure indicator
	3	Go elsewhere
	4	Minus function
	5	Wrong card
	6	Message pending
	7	Message reminder
Byte 0F	0	Printer printing – local copy
	1	If display has printer assigned for local copy
	2	Printer matrix changed (associated with this display)
	3–7	Reserved
Byte 10	0	Invalid dead key
	1	2NN machine check
	2	Communication check
	3	Program check
	4	Security key off
	5	3NN machine check
	6	Too much data entered
	7	Operator not authorized
Byte 11	0	Not enough data entered
	1	Wrong number
	2	Numeric shift
	3	Operator retry
	4	Device not functional
	5	Device busy doing local copy

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-16 (Page 2 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	6	X.21/X.25 operator communication
	7	System lock (X-System)
Byte 12	0	Communication check reminder
	1	My job indicator
	2	System operator indicator
	3	Unowned indicator
	4	Not enabled (not online)
	5	Reserved for engineering use
	6	Reserved for engineering use
	7	Minus symbol indicator (WT)
Byte 13	4	PU not active
Bytes 16 – 17		Cursor position (CUT display only)[2]
Bytes 1A – 1B		First character on display[2]
Bytes 1C – 1D		Last character on display[2]
Byte 24	0	Model 5 wide screen
	1	Model 5 wide screen
	2	Reserved
	3	Reserved for engineering use
	4	Inhibit display video
	5	Blank cursor
	6	Cursor reverse
	7	Cursor blink
Byte 25	3	APL mode
	4	APL attached
Byte 26		Row length
Byte 27		Indicator row length (if printer then PCIA length)
Byte 29		AID Code
Byte 33		Printer buffer size 08 = 2K 10 = 4K 20 = 8K
Byte 36	0	Printer allocated to local copy
	1	SNA – local copy printer allocated to host
	2	SNA – host request for local copy allocated printer
	3	Alternate row length
	4	Default row length indicator
	5	Reserved for engineering use
	6	SNA – LU in ERP state
	7	SNA – Host communication disabled (LU active)
Byte 37	0	Local copy printing (host-initiated)
	1	Local copy printer available (display only)

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-16 (Page 2 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	2	Local copy (printer available for next message) SNA
Byte 3C		Reserved
Byte 3D		Reserved
Byte 3E		4NN (Program check number)
Byte 3F		5NN (Communication check number)
Byte 4A	0	Reserved
	1	Selector pen for immediate defect field
	2	Request for select pen field
	3	Reserved for engineering use
	4	Reserved for engineering use
	5	Reserved
	6	Reserved
	7	Reserved for engineering use
Byte 4B	0	Disable cursor display
	1	Reserved for engineering use
	2	Second local copy requested
	3	Local copy busy
	4	Reserved for engineering use
	5	Dead key sequence in progress
	6	Local copy received IR
	7	Reserved for engineering use
Byte 4C	0	Device attached to CU VIA AEA adapter
Byte 52	0 – 7	Attribute affecting field cursor[3]
Byte 53	0 – 7	Current extended field attribute
Bytes 54 – 55		Present attribute address[2]
Bytes 56 – 57		Next attribute address[2]
Byte 68	0	Printer equipment check/display disabled error
	1	Intervention required
	2	Printer busy processor abort
	3	Reserved for engineering use
	4	Print in process
	5	Start printing pending
	6	Printer disabled
	7	Reserved for engineering use
Byte 6A	0	Shift/numeric lock key still depressed
	1	Alpha key depressed
	2	Alternate shift key depressed
	3	Shift/numeric lock key in effect
	4	Left shift key
	5	Right shift key
	6	Katakana shift key was pressed
	7	APL key select APL mode

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-16 (Page 3 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 6B	0	Reserved for engineering use
	1	Local copy being printed
	2	Reserved for engineering use
	3	Reserved
	4	Reserved
	5	Reserved
	6–7	Reserved for engineering use
Byte 70		Local copy printer ID
Byte 71		Local copy printer address
Bytes 72–73		Printer DCB devices 0 – 15, ones in this field are authorized to use this printer
Bytes 74–75		Printer DCB devices 16 – 31 (same as Bytes 72, 73 description)
Bytes 76–77		Printer class assignments (printer only) 1 in one or more bits (0–15) represents printer class assignments 70–85
Byte A0		WCC save area
Byte AE	0	LU active
	1	Device is bound
	2	Start data traffic (DFT - pending bind response)
	3	Outbound pacing ind (DFT - pending unbind response)
	4–6	Half-duplex FSM 000 = Send state 001 = Pending send 010 = Pending receive 101 = Contention 111 = Receive
	7	Error pending (response sent)
Byte AF	0–3	Bracket state mach 0000 = Between brackets 1111 = In brackets 0001 = Pending in brackets 0010 = Pending begin bracket 0011 = Pending between bracket-EC received 0100 = Pending between bracket-EC sent 0101 = Pending between bracket-response received 0110 = Pending between bracket-response sent 0111 = Pending between bracket-purge received 1000 = Pending between bracket-receive 1001 = Pending between bracket-purge sent
	4	0 = Send between chain 1 = Send in chain
	5–6	Chain receive 00 = Receive between chain 01 = Receive in chain 11 = Receive purging chain
	7	Crypto inbound padding indicate
Byte B0	5	End chain receive
	6	0 = Outbound segmenting between BIU 1 = Outbound segmenting in BIU
Byte B1	4	0 = Not last buffer in this RU 1 = Last buffer in this RU
	5	First buffer in RU
Byte B5	0–7	LU type bound (01,02,03)
Byte B6	0–7	Printer outbound pacing count
Bytes DC–DD		Default screen size
Bytes DE–DF		Alternate screen size
Byte F3	0	LT trace enabled

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-16 (Page 3 of 3). LT Control Area Bit Definitions

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Test 6, Option 3

Figure 2-42 shows the information for X.21 short-hold mode.

```
                    ____X.21 /X.25 SHM Host Control Data____

      0    2    4    6    8    A    C    E
      0000 0000 0000 0000 0000 0000 0000 0000
00    uuuu uuuu uuuu uuuu uuuu uuuu uuuu uuuu
10    uuuu uuuu uuuu uuuu uuuu uuuu uuuu uuuu
20    uuuu uuuu uuuu uuuu uuuu uuuu uuuu uuuu
30    xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
40    xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
50    xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
60    xxxx
70
80
90
A0
B0
C0
D0
E0
F0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Where:

uuuu = XID sent by the 3174 (comes from configured data)
xxxx = XID received by the 3174 on a reconnection

Figure 2-42. X.21 Short-Hold Mode Host Control Data

The configured XID (the one sent to the host at start time) and the last reconnect XID (the last one sent to the host during an SHM session) are displayed. If, for example, a normal X.21 host connection should be established following an SHM connection, the XID displayed by /6,3 would be for the last SHM connection. Bit 6 (SHSI) in the XID sent indicates short hold mode is active: it is not sent on with the initial XID; it is sent during a reconnection. This bit is turned on after an SNRM (Set Normal Response Mode) has been received. Table 2-17 on page 2-195 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-42.

Table 2-17. X.21 XID Summary

Location	Bit	Meaning
Byte 00[1]		Format of XID I-field and PU type of
	0–3	Format of XID I-field. 0 = fixed format; bytes 00–05 used 1 = variable format; bytes 0–P are used
	4–7	PU type of the sender 1 = PU-T1 2 = PU-T2 3 = Reserved 4 = PU-T4 5 = PU-T5
Byte 01		Length in hexadecimal of the variable format XID I-field. This byte is reserved in a fixed format XID.
Bytes 02–07[2]		Node identification
Bytes 02-05	0–11	The product block number.
	12-31	The SDLC ID.
Bytes 06,07		Reserved
Byte 08		Link-station and connection protocol flags
	0–1	Reserved
	2	Link station role of XID sender 0 = Sender is a secondary link station 1 = Sender is a primary link station
	3	Reserved
	4–7	Link station transmit/receive capability 0 = two way alternating 1 = two way at the same time
Byte 09		Node characteristic of the XID sender
	0	PU capability to receive FMD requests 0 = PU cannot receive FMD requests from the SSCP 1 = PU can receive FMD requests from SSCP
	1	Reserved
	2–3	Segment assembly capability of the nodes PC element 00 = The mapping field is ignored and PUIs are forwarded unchanged 01 = Segments are assembled on a link station basis 10 = Segments are assembled on a session basis 11 = Only whole BIUs are allowed

[1]Byte 00 = 12 for 3174 variable format XIDs
[2]Bytes 2–7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved
[3]Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Table 2-17. X.21 XID Summary

Location	Bit	Meaning
	4–5	Reserved
	6[3]	Short hold status indicator (SHSI) 0 = Not already engaged in a SHM session 1 = Engaged in a SHM session
	7	Short hold indicator (SHI) 0 = Short-hold mode not supported 1 = Short-hold mode supported
Byte 10		Maximum I field length the XID sender receives
	0	Format flag (always 0)
	1–15	Maximum I (field length)
Byte 12	0–3	Reserved
	4–7	SCLC command/response profile 0 = SNA link profile (only value)
Byte 13	0–1	Reserved
	2	SDLC initialization mode options 0 = SIM and RIM not supported 1 = SIM and RIM supported
	3–7	Reserved
Byte 14–15		Reserved
Byte 16	0	Reserved
	1–7	Maximum number of I frames that can be received by the XID sender before an ACK is sent
Byte 17		Reserved
Byte18		Length in bytes of the SDLC address to be assigned. Byte 18 is not used by the 3174. (Byte 18 = 00).
Byte 19		The length of the dial digits in hexadecimal of the XID sender.
Byte 20		The starting byte of the XID sender dial digits.

[1]Byte 00 = 12 for 3174 variable format XIDs
[2]Bytes 2–7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved
[3]Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Type **3** to select option 3 from the Display Control Blocks Menu. The following panel shows the information for X.25.

```
                    _____X.21/X.25 Host Control Data_____

      0     2     4     6     8     A     CE

      0000  0000  0000  0000  0000  0000  0000  0000
00    iiii  iiii  iiii  iiii  iiii  iiii  iiii  iiii
10    iiii  iiii  iiii  iiii  iiii  iiii  iiii  iiii
20    iiii  iiii  xaxb  xxxx  xxxx  xxxx  xxxx  xxxx
30    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
40    xxxx  xxxx  xxxx  rrrr  xxxx  xxxx  rrrr  rrrr
50    zzzz  zzzz  zzzz  zzzz  rrrr  zzzz  zzzz  zzzz
60    rrrr
70
80
90
A0
B0
C0
D0
E0
F0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _
PF: 3=Quit                                  12=Test menu
```

Where:

iiii = Reserved for engineering use
xxxx = 2-byte link counter
xaxb = 2-byte link counter used in the example below
zzzz = 2-byte circuit counter
rrrr = Reserved

Figure 2-43. X.25 Host Control Data

Use the following example to determine how to locate a particular byte and the information following the example for descriptions of the link and circuit counters. The bytes are described in Table 2-17 on page 2-195, "Link Counters" on page 2-197, and "Circuit Counters" on page 2-197.

Example

To locate bytes 24 and 25:

1. Use the high-order digit 2. Scan down the column of numbers in the left margin of the panel. Find address 20.
2. Use the low-order digit 4. Scan left to right in the row of data next to address 20. Find the data under column number 4. Byte 24 contains xa; byte 25 contains xb.

Link Counters

Bytes 24, 25 = The number of Information (I) frames sent by the 3174.

Bytes 26, 27 = The number of Information (I) frames received by the 3174.

Bytes 28, 29 = The number of Receiver Ready (RR) frames sent by the 3174.

Bytes 2A, 2B = The number of Receiver Ready (RR) frames received by the 3174.

Bytes 2C, 2D = The number of Receiver Not Ready (RNR) frames sent by the 3174.

Bytes 2E, 2F = The number of Receiver Not Ready (RNR) frames received by the 3174.

Bytes 30, 31 = The number of Reject frames sent by the 3174.

Bytes 32, 33 = The number of Reject frames received by the 3174.

Bytes 34, 35 = The number of I-frames that were retransmitted by the 3174.

Bytes 36, 37 = The number of I-frames that were received by the 3174 with Frame Check Sequence (FCS) errors.

Bytes 38, 39 = The number of receive errors detected by the 3174.

Bytes 3A, 3B = The number of cycle steal underruns detected by the3174. This is an internal-exception condition and is retried by the 3174.

Bytes 3C, 3D = The number of receive buffer overruns detected by the3174. This is an internal-exception condition and is retried by the 3174.

Bytes 3E, 3F = The number of receive control block overruns detected by the 3174. This is an internal-exception condition and is retried by the 3174.

Bytes 40, 41 = The number of aborts detected by the 3174.

Bytes 42, 43 = The number of CS overruns detected by the 3174. This is an internal-exception condition and is retried by the 3174.

Bytes 44, 45 = A valid frame has not been received within the time limit specified during configuration.

Bytes 48, 49 = The number of call attempts counted by the 3174.

Circuit Counters

Bytes 50, 51 = The number of Data packets sent by the 3174.

Bytes 52, 53 = The number of Data packets received by the 3174.

Bytes 54, 55 = The number of Receiver Ready packets sent by the 3174.

Bytes 56, 57 = The number of Receiver Ready packets received by the 3174.

Bytes 5A, 5B = The number of Receiver Not Ready packets sent by the 3174.

Bytes 5C, 5D = The number of Interrupt packets sent by the 3174.

Bytes 5E, 5F = The number of Interrupt packets received by the 3174.

Test 7: Color Convergence

Test 7 performs color convergence on 3279 color display stations. For a description of this procedure, see the appropriate display station problem determination manual.

Note: No PF keys are provided for this test to return to the Test Menu. To bring up the Test Menu after performing the test, press the CLEAR key.

Test 8: Extended Functions and Programmed Symbols

Test 8 checks the programmed symbols (PS) and color for any device that uses PS or color. For a description of this procedure, see the appropriate display station problem determination manual.

Test 9: Display the Token-Ring Test Menu

Test 9 provides a test facility to check the status of the Token-Ring, the Token-Ring adapter, and attached links. To select one of the test options from the Token-Ring Test Menu, perform the following at any 3278 or similar display station.

Note: Test 9,1 can only be performed from one terminal at a time.

1. Press and hold ALT; press TEST
2. Type in **/9**
3. Press ENTER; the Token-Ring Test Menu is displayed.
4. Type in a test option number and press ENTER.

```
                    _____ Token-Ring Test Menu _____

Option          Description

1               Monitor Token-Ring status
2               Display Token-Ring adapter status summary
3               Reset Token-Ring adapter status counters
4               Display link status summary for all links
5,n             Display link status summary for link address n
6               Reset link status counters for all links
7,n             Reset link status counters for link address n
8               Display Gateway host status summary


To go directly to other tests, enter: /Test,Option
Select Option;  press ENTER ===> _


PF: 3=Quit                  12=Test menu
```

Figure 2-44. Token-Ring Test Menu

Option 1. Monitor Token-Ring Status. See Figure 2-45 on page 2-200.

Option 2. Display Token-Ring status summary. See Figure 2-46 on page 2-201.

Option 3. Reset the Token-Ring adapter status counters.

Option 4. Display link status for all links. See Figure 2-47 on page 2-203

Option 5. Display the link status counters for the 6 links starting with the link selected in the test request. A 7-byte link address is required for this test. The address is a 6-byte Token-Ring adapter address followed by the 1-byte link station service access point (SAP) address.

Option 6. Reset link status counters for all links.

Option 7. Reset the link status counters for the link selected in the test request.

Option 8. The number of customized links and host address ranges is displayed. For each customized link, it will display the host address, the host link status, and the Token-Ring address. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.) See Figure 2-48 on page 2-207 for an example of the Gateway Host Status Summary panel.

Note: Option 8 is only available on those controller units with the Gateway feature. The feature is available on Models 1L, 1R, 2R, 11L 11R, 12R, 51R, 52R, 61R, and 62R.

Test 9, Option 1

The following panel is displayed.

```
                    _____Token-Ring Status_____

4697 - Local Token-Ring Adapter closed

4691 - Signal Loss (Adapter not detecting ring signal)

4692 - Hard Error (Adapter detecting a beacon condition)
         either internally or receiving a Beacon MAC frame)

4693 - Wire Fault (Adapter has detected a wire fault
       and de-inserts)

4694 - The test has been active for 00000 minutes.

4695 - The test will terminate in n minute(s)
         Press PF9 to continue for another 10 minutes.

To go directly to other tests, enter: /Test,Option
Select Test; press ENTER ===> _

PF: 3=Quit                  9=Cont              12=Test menu
```

Figure 2-45. Token-Ring Status (Example showing messages that could occur)

4697 - Indicates that the Token-Ring adapter is closed.
4691 - Appears when the Token-Ring adapter detects a signal loss condition on the ring.
4692 - Appears when the Token-Ring adapter detects a beaconing condition.
4693 - Appears when the Token-Ring adapter detects a wire fault (open or short) condition on its own lobe.
4694 - Indicates the amount of time that has elapsed from the start of the ring status test.
4695 - Appears when the test has been running for 10 minutes. The test runs for another 5 minutes and terminates automatically, unless PF9 is pressed. If PF9 is pressed within the 5-minute time frame, the test runs 10 or more minutes and 4695 is displayed again.
4698 - Appears when the Token-Ring adapter is open.

Test 9, Option 2

The following panel is displayed.

```
                ____Token-Ring Adapter Status Summary____

Adapter Address -   XXXXXXXXXXXXX    Adapter Status -   Open

Customized Links -  XXX              Active Links -     XXX

                       Counters         Overflow

Line Errors            XXXXXXXX            0
Internal Errors        XXXXXXXX            0
Burst Errors           XXXXXXXX            0
ARI/FCI Errors         XXXXXXXX            0
Abort Delimiters       XXXXXXXX            0
Lost Frames            XXXXXXXX            0
Receive Congestion     XXXXXXXX            0
Frame Copied Errors    XXXXXXXX            0
Frequency Errors       XXXXXXXX            0
Token Errors           XXXXXXXX            0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                        12=Test menu
```

Figure 2-46. Token-Ring Adapter Status Summary

- **Adapter Address** - This is the 6-byte Token-Ring address of the Token-Ring adapter set up when the controller unit was configured, followed by a 1-byte service access point address (SAP).
- **Adapter Status** - This shows the Token-Ring adapter's physical state relative to the Token-Ring (opened or closed).
- **Customized Links** - The number of links identified during configuration of the Control diskette. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.)
- **Active Links** - The number of the links active at the time the test request was entered.

Line errors - This counter is increased when a frame is copied or repeated by the protocol handler, the error detect indicator is zero, and one of the following conditions exists:

- A code violation exists between the starting delimiter and the ending delimiter of a frame.
- A code violation in a free token.
- A frame check sequence error is a format type 1 frame.

Internal errors - This counter is increased when the controller recognizes an internal Token-Ring adapter error. These errors indicate the Token-Ring adapter is in a marginal operating condition.

Burst errors - This counter shows the number of burst interrupts from the protocol handler. The burst error counter indicates the number of frames that are in error due to noise on the ring.

Address Recognized Indicator/Frame Copied Indicator (ARI/FCI) - This counter is increased when the Token-Ring adapter receives a frame back that has the address recognized and/or the frame copied bit not set. This error is due to the receiving station having no buffers available, or a wrong address received (line hit), or the ARI/FCI bits could not be set.

Abort Delimiters - This counter is increased when the Token-Ring adapter transmits an abort delimiter. This occurs with internal Token-Ring adapter errors.

Lost Frames - This counter is increased when the Token-Ring adapter is in transmit mode and fails to receive the frame it transmitted.

Receive Congestion - This counter is increased when the Token-Ring adapter is busy and recognizes a frame addressed to it, but cannot receive the frame because of insufficient buffer space.

Frame Copied Errors - This counter is incremented when the Token-Ring adapter sees a frame with its own address and the ARI or FCI bit is set on. This indicates that another device or controller may be attached to the ring that has a duplicate address.

Frequency Errors - This counter is increased when the Token-Ring adapter detects an excessive difference between the ring data frequency and the Token-Ring adapter's frequency oscillator.

Token Errors - This counter is increased when the active monitor function detects an error with the token protocol. These errors indicate another device or controller is not following normal token protocols.

Test 9, Option 4

The following panel is displayed.

```
                    ____ Link Status Summary ____

Link Address        XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX
Primary/Secondary         XX/XX             XX/XX             XX/XX
Trans I-Frames       XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Rec I-Frames         XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Transmit Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Received Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
T1 Expired           XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Com/Res Ind               XX YY             XX YY             XX YY

Link Address        XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX

Primary/Secondary         XX/XX             XX/XX             XX/XX
Trans I-Frames       XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Rec I-Frames         XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Transmit Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Received Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
T1 Expired           XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Com/Res Ind               XX YY             XX YY             XX YY

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit      7=Back    8=FWD                  12=Test menu
```

Figure 2-47. Link Status Summary

The link status summary screen shows the link address, the data link control (DLC) primary and secondary states, the command/response indicator, and the logical link station counters.

Link Address - This is the station address assigned to each link during configuration. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Trans I-Frames - This counter shows the number of Information format LPDUs that have been sent, including all retransmissions. The actual counter for the link is reset when there is an overflow of any counter, or whenever the link is initialized.

Rec I-Frames - This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors - This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Receive Errors - This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired - This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

Com/Res Ind - XX indicates the last command/response received. ZZ indicates the last command/response sent.

Primary/Secondary - These are the SDLC primary and secondary states for the link station,

Where:

Primary State		Secondary State	
80	Link Closed	80	Checkpointing
40	Disconnected	40	Local busy (operator)
20	Disconnecting	40	Local Busy (buffer)
10	Link Opening	10	Remote Busy
08	Resetting	08	Rejection
04	Frame Reject Sent	04	Clearing Algorithm Running
02	Frame Reject Received	02	Dynamic Window
01	Link Opened	01	Reserved

Note: The primary states are mutually exclusive. The secondary states are not mutually exclusive.

Primary States

The following paragraphs describe the Token-Ring adapter link primary states.

Link Closed

The link closed state is entered in the following cases:

- A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission will complete when the transmission completes.
- A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.
- A Reset command has been received, but a transmission has already been queued to the hardware, or an ARB request or SSB response has been queued to the controller and must complete before the link station control block can be released.

No commands are accepted while the Token-Ring adapter is in the link closed state. All received frames are ignored.

Disconnected

The disconnected state is entered in the following cases:

- Acceptance of an Open Station SRB
- Acceptance of a SABME for a previously nonexistent station
- Receipt of a DISC command or a DM response from the paired station
- When the retry count has been exhausted due to time-outs.

In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

The following SRBs are accepted:

Close station SRB - Transition to link closed.
Connect station SRB - Transition to link opening.

Disconnecting

The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state may also be entered on expiration of the retry count in FRMR received. This state is maintained until one of the following occurs:

- Either a UA or DM response is received to the transmitted DISC command.
- A SABME command is received and a DM response has been transmitted.
- The retry count expires.

There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting is to disconnected. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The token-ring adapter exits this state to the link is nonexistent or the link is closed. Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

Link Opening

The Token-Ring adapter enters the link opening state when the controller accepts a Connect station SRB.

Resetting

The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The Token-Ring adapter reports receipt of the SABME command to the controller unit using a DLC Status ARB indicating a SABME command was received and the Station ID of the affected station. In this state, the Token-Ring adapter accepts the following SRBs:

Close Station SRB - Transition to the disconnecting state.
Connect Station SRB - Transition to the link opening state.

All incoming frames are ignored except the following:

DISC - Transmit UA, transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to FRMR received.
SABME - The Token-Ring adapter informs the controller.

Frame Reject Sent

When the Token-Ring adapter transmits a Frame Reject (FRMR) because of the receipt of an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

All incoming frames except the following are ignored except that FRMR response final will be transmitted in response to command polls:

SABME - Transition to the resetting state.
DISC - Transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to the FRMR received state.

Frame Reject Received

When the Token-Ring adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The Token-Ring adapter then enters the FRMR received state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

In this state, all frames except the following are ignored:

SABME - Transition to the resetting state
DISC - Transition to the disconnected state
DM - Transition to the disconnected state.

Link Opened

The link opened state is entered from link opening after the SABME-UA exchange which completes the connection protocol. This is the only state in which information transfer is allowed and in which transmit SRBs are accepted. In this state, the Token-Ring adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

If the primary state is changed from link opened because of receipt of a frame such as SABME or FRMR, or because the retry count has been exhausted, any outstanding Transmit requests are returned to the controller by using a single Transmit SSB. If the primary state is changed because of a user command such as Close station, outstanding Transmit requests are not returned.

Secondary States

The following paragraphs describe the Token-Ring adapter link secondary states.

Checkpointing

A poll is outstanding. I-frame transmission is suspended.

Local Busy (User)

A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.

Local Busy (buffer)

An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.

Remote Busy

An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.

Rejection

An out of sequence I-frame has been received and a REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.

Clearing

A poll is outstanding and a confirmation of clearing Local Busy is required after the response is received.

Dynamic Window

A remote station on another ring is connected through a bridge to the local ring and there appears to be congestion through the bridge(s).

Test 9, Option 8

The following panel is displayed.

```
                ____ Gateway Host Status Summary ____

Customized Links -       XXX            Address Range -          XX-XX

Host      Link       Token-Ring        Host      Link       Token-Ring
Address   Status     Address           Address   Status     Address
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX

To go directly to other tests, enter: /Test,Option
Select ===>

PF:  3=Quit      7=BACK        8=FWD              12=Test menu
```

Figure 2-48. Gateway Host Status Summary

The Gateway Host Status Summary panel shows information on the links and addresses, and the status of the links.

Customized Links - The number of links declared at customizing time if storage was available to support them or the maximum number of links possible in the storage available (this field reflects the downgraded configuration). This field reflects one link for the local PU.

Address Range - The host address range declared in customizing. This field reflects the downgraded condition.

Host Address - The address assigned each link during customizing

Link Status - The 2-digit status code representing the status of the link:

For Model 1L and 11L:

00 = The Token-Ring attached physical unit is in disconnect mode
02 = The Token-Ring attached physical unit is connected.

For Models 1R, 2R, 11R, 12R, 51R, 52R, 61R, and 62R

00 = SNRM required
01 = SNRM received
02 = Connected/active
03 = Poll timeout.

Token-Ring Address - The station address assigned to each link during customizing. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Test 10: Port Wrap Tests

Test 10 runs a wrap test on ports on the terminal adapter, the TMA card, the 3299 Models 2 and 3, and the 7232 dual control unit terminal multiplexer. Test 10 will not run on a 3299 Model 1. If a terminal is in use on one of the ports selected for a wrap test, this test will not interrupt the operation of that terminal. The wrap test will not be performed, and the test will indicate that the selected port is in use. This test cannot be run on the requesting terminal. The results of the port wrap test will be indicated by a text message on line 23. The menu displayed is shown in Figure 2-49. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/10**
3. Press ENTER.

```
                        _____ Port Wrap Test _____

Option        Description

1,n           Direct wrap for terminal adapter port n
2,n           3299/terminal multiplexer wrap for port n (n=0-31)

              To insure a valid wrap the cable must be
              disconnected from the wrapped port.


To go directly to other tests, enter: /Test,Option
Select Option;  press ENTER ===> _



PF: 3=Quit                          12=Test menu
```

Figure 2-49. Port Wrap – Test 10

When using Test 10, disconnect the signal cable from the port that is being wrapped. Reflections from the signal cable can cause the test to fail, giving a false error indication. If failures occur, see the *3174 Subsystem Control Unit Status Codes*, GA27-3832, for recovery action.

Option 1 (Direct Wrap)

- For Models 1L through 13R, valid terminal adapter port numbers are 0, 8, 16, and 24.
- For Models 51R through 63R, valid terminal adapter port numbers are 0 through 8.
- For Models 81R through 92R, the valid port number is 0.

Option 2 (Multiplexer Wrap)

- For Models 1L through 13R, valid port numbers are 0 through 31.
- For Models 51R through 63R, valid port numbers are 0 through 15.
- For Models 81R through 92R, valid port numbers are 0 through 7.

Test 11: Trace Control

This test is to be used by service representatives. The service representative must obtain a password from an IBM support facility to perform this test.

Trace Control is an internal subsystem facility that is used to record specific subsystem processing information. The information that is traced is saved in machine storage and can be written to the Control diskette as required. Two types of information can be recorded by the trace facility:

- Data between processes
- Internal data flow.

Environment control block (ECB) traces record information between processes. When ECBs are traced, the appropriate ECB numbers are entered as part of the trace test request.

Function traces record information within a process. For example, internal data flow for the file adapter is recorded.

The trace facility is performed in two environments:

- Background
- Foreground.

Background trace is integrated into the controller microcode and is started as a part of the controller normal IML sequence. Background trace must be stopped before a foreground trace can be started.

Foreground trace is started by selecting a Test 11 option and specifying ECB(s) tracing or Internal Data Flow tracing. Test 11 provides a means of starting, stopping, or modifying a particular trace. When the trace facility is started, with a Start Trace command, a foreground trace starts. When the trace facility is stopped with a Stop Trace command, all traces are stopped. When a foreground trace is no longer required, the foreground trace must be stopped and the background trace must be restarted, either by use of the Test 11 trace facility or by a normal IML.

Trace Control Mode

There are four trace control modes. Mode 02 is the default mode if another mode is not selected when setting up a trace.

Mode 01 Do not write to the diskette or fixed disk and do not wrap the trace data area in controller storage.
Mode 02 Do not write to the diskette or fixed disk and wrap the trace data area in controller storage.
Mode 03 Write to diskette or fixed disk without suspend.
Mode 04 Write to diskette or fixed disk with suspend.

How to Use the Trace Facility

Before you attempt to start or stop a trace, the following information must be obtained from the 3174 support center:

- Check digit
- Trace mode (optional)
- Setup ECB number(s) or Setup Trace Function number(s).

Trace Facility Options

- 11,1,Check digit,n,n,n,n.....n Set Up ECB(s) Dispatched
- 11,2,Check digit,n,n,n,n.....n Set Up ECB(s) Returned
- 11,3,Check digit,n,n,n,n.....n Set Up DCB(s) Ports
- 11,4,Check digit,n,n,n,n.....n Set Up Trace Functions
- 11,5,Check digit,nn Set Up Trace Mode
- 11,6,Password Start Trace
- 11,7,Password Stop Trace

11,1 Option The specified ECBs are traced when dispatched. Format = 11,1,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,2 Option The specified ECBs are traced when returned.
Format = 11,2,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,3 Option The specified ports are traced.
Format = 11,3,Check digit,n,n,n,n.....n where n,n,n,n.....n are port numbers. The check digit number and the port number(s) are obtained from the 3174 support center.

11,4 Option The specified functions are traced.
Format = 11,4,Check digit,n,n,n,n.....n where n,n,n,n.....n are trace function numbers. The check digit number and the trace function number(s) are obtained from the 3174 support center.

11,5 Option The trace runs in the specified mode.
Format = 11,5,nn where nn are mode numbers 01 through 04. The check digit number and the mode number are obtained from the 3174 support center.

11,6 Option The trace is started.
Format = 11,6,password
The password is obtained from the 3174 support center.

11,7 Option The trace is stopped.
Format = 11,7,password
The password is obtained from the 3174 support center.

How to Start a Foreground Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press TEST to enter test mode.
2. Type in **11,7,Password** (Stop Trace)
3. Type in **11,5,check digit,nn** (Set Up Trace Mode) (This step is optional.)
4. Type in one of the following to set up the desired trace:
   11,1,check digit,n,n,n,n.....,n
   11,2,check digit,n,n,n,n.....,n
   11,3,check digit,n,n,n,n.....,n
   11,4,check digit,n,n,n,n.....,n
5. Type in **11,6,password** (Start Trace)
6. Type in **11,7,password** (Stop Trace)

Note: The password is obtained from the 3174 support center.

How to Start a Background Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press Test to enter test mode.
2. Type in **11,7,Password**
3. Type in **11,6,Password**

Note: The password is obtained from the 3174 support center.

Test 12: Asynchronous Emulation Adapter Tests

Test 12 provides a test facility for terminals, ports, and smart-modems attached to an Asynchronous Emulation Adapter (AEA). It also provides a status summary for all ports of the three Asynchronous Emulation Adapter hardware groups (HGs), and allows line errors to be reset for an individual Asynchronous Emulation Adapter port or for all ports of a specific Asynchronous Emulation Adapter HG. When Test 12 is selected, the menu shown in Figure 2-50 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/12**
3. Press ENTER; the Asynchronous Emulation Adapter Test Menu is displayed.

```
                ____ Asynchronous Emulation Adapter Tests ____

Option     Description

  1        AEA ports test menu
  2        Display status summary
  3        Reset line errors on all AEA HGs
  3,n      Reset line errors on HG n (n=21-23)
  4,m,n    Display error counters for
           port m on HG n (m=0-7, n=21-23)
  5,m,n    Display connectivity for port m HG n (m=-7, n=21-23)

Note:
   - Option 1 exits from 3174 TEST mode

To go directly to other tests, enter: /Test,option
Select option;  press ENTER ===> _

PF:  3=Quit                                  12=Test menu
```

Figure 2-50. Test 12 Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter menu to display the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-51 on page 2-214 for an example of the test menu.

Option 2. Select option 2 on the Asynchronous Emulation Adapter menu to display the status summary for the ASCII terminals on all three ASCII HGs. See Figure 2-52 on page 2-216 for an example of the status summary panel.

Option 3. Select option 3 on the Asynchronous Emulation Adapter menu to reset the line errors on all the ASCII HGs installed.

Option 3,n. Select option 3 to reset the line errors for the specific HG n.

Option 4,m,n. Select option 4 to display error counters for a specific port.

Option 5,m,n. Select option 5 on the Asynchronous Emulation Adapter menu to display connectivity for a specific port.

Test 12, Option 1

This test option shows the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-51 on page 2-214 for an example of the test menu.

```
              _____Asynchronous Emulation Adapter Port Tests_____

Option     Description

  1,PN,HG          Connect to smart-modem
  2,PN,HG          AEA port wrap
  3,PN,HG          Transmit data (default settings)
  3,PN,HG,WXYYZZ   Transmit data (override settings)

PN=Port Number (0-7)    HG=Hardware Group (21-23)
WXYYZZ=Override port and station descriptor values

NOTES:
    - Use MENU REQUEST key sequence to return to this menu
      when above options are selected
    - Option 2 requires a wrap plug on requested port
    - Use TEST REQUEST key sequence to return to 3174 TEST mode

Select option;  press ENTER ===> _

PF:  3=Quit                                  12=Disconnect
```

Figure 2-51. Asynchronous Emulation Adapter Port Tests Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter Port Tests Menu to access and test a smart-modem through its Asynchronous Emulation Adapter port, provided that port is not presently in session. Access and manipulation of the modem, using that modem's command syntax, enables the following:

- Modem Customizing and Test

  This function provides access to internal diagnostic and customizing procedures built into certain smart-modems. There are two reasons why this function is important:

  1. By running diagnostics internal to the modem, you will be able to isolate a problem in the asynchronous communication equipment on a specific port, provided proper operation of the Asynchronous Emulation Adapter port has already been verified.
  2. By customizing the modem to certain specifications, you can ensure proper operation or verify whether or not the modem had been customized correctly for normal operation.

- Modem Dial-out Function

  This function enables you to test the dial-out capability of the modem. By providing a number to the modem of a phone nearby or of an actual ASCII dial-in port, you can verify proper operation of the modem.

Option 2. Select option 2 on the Asynchronous Emulation Adapter Port Tests Menu to access an Asynchronous Emulation Adapter port not presently in session. This access allows you to perform a wrap test on the Asynchronous Emulation Adapter port.

Note: The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) must be installed on the port connector before invoking the wrap test.

If a modem cable is attached to the port being tested, by installing a wrap plug at the modem end of that cable you can also test the cable.

Option 3. Select option 3 on the Asynchronous Emulation Adapter Port Tests Menu to verify an ASCII terminal's ability to transmit and receive data correctly. From the invoking terminal, you can send data through the Asynchronous Emulation Adapter port connector to a terminal not presently in session. This test will verify the data path and the operation of the terminal receiving the data.

Example of Option 3,PN,HG Test:

1. At any ASCII terminal, terminate the customer application or session (if active) and return to the Connection Menu.
2. For most ASCII terminals, hold down Esc and press T to enter test mode. (For those terminals that do not accept Esc and T for test mode, see the *3174 Terminal User's Reference*, GA23-0332.)
3. At the 3174 Test Menu, select Option 12 (Asynchronous Emulation Adapter Tests).
4. At the Asynchronous Emulation Adapter Test Menu, select Option 1 (AEA Port Tests Menu).
5. At the AEA Port Tests Menu, type in **3,PN,HG** where:
   PN = Port Number (0–7) of the device being tested
   HG = Hardware Group (21, 22, or 23) of the device being tested.
6. Press carriage return.
7. The controller responds with a READY message.
8. Perform steps a and b **only** if the device being tested is attached to a switched port with a smart-modem. If the port is nonswitched, go to step 9.
   a. Type in **ATD9,,XXX-XXXX** where:
      ATD (uppercase characters) must be keyed in while holding the shift key.
      9 is the access code (optional), and ,, is two 2-second pauses.
      XXX-XXXX is the phone number of the smart-modem attached to the device being tested.
   b. Press carriage return. The controller responds with a CONNECT message.
9. Type in a test message or any string of characters.
   The message or characters will not appear on your terminal.
10. Press carriage return. The data will appear on the device being tested.
11. A test message can then be entered at the device being tested and sent back to the invoking terminal by keying in the test message and pressing carriage return.
12. To return to the Asynchronous Emulation Adapter Tests menu, press ESC, hold down CTRL, and press H.

The override settings, indicated by WXYYZZ on the test menu, are parameters used by the controller to communicate with ASCII devices. These parameters are entered during customizing and this test allows you to temporarily change them without changing the actual customizing.

Note: If you enter override settings, you may also need to change the parameters on the ASCII device(s) you are testing.

The following table shows the values for WXYYZZ:

Table 2-18. WXYYZZ Override Settings

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Mark	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Space	20 = DTR	
3 = 1200 bps	3 = Even	80 = XON/XOFF	
4 = 2400 bps	4 = Odd		
5 = 4800 bps	7 = None		
6 = 9600 bps			
7 = 19 200 bps			

Test 12, Option 2

Figure 2-52 shows the status of the Asynchronous Emulation Adapter(s) and all devices attached to it.

```
                        _____Status Summary_____

Port              HG 21              HG 22              HG 23

Address       0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7

Attach        d s d d 1   s 1
Status        1 1 1 0 1 x 0 -    (Disabled)         (Not present)
Station       v v v p h   ? h
Line          . . : . .     *
Host/term     3 A 3   3
LU            +   +

  d = direct        1 = on            v = video display     . = 0 errors
  1 = nonswitched   0 = off           p = printer           : = 1-50
  s = switched      - = disabled      h = host              | = 51-100
  3 = 3270          x = unconfigured  ? = unknown           * => 100
  A= ASCII          + = in session

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit                                    12=Test Menu
```

Figure 2-52. Test 12 Status Summary Panel

Port Address: Indicates the terminal port number (0—7) for HG 21, 22, and 23.

Attach: Indicates how the terminal is attached to the Asynchronous Emulation Adapter port.

blank = No attachment type (port unconfigured)
d = Direct attachment
s = Switched attachment
l = nonswitched attached

Status: Indicates the state of the terminal at the time the status summary was requested.

Disabled = This Asynchronous Emulation Adapter is in the disabled state.
Not present =This Asynchronous Emulation Adapter is not installed in the controller.
0 = The terminal on that specific port is powered off (no current connection).
1 = The terminal on that specific port is powered on (connection present).
x = The port is not configured.
– = The terminal or specific port is in a disabled state (no connections possible, unusable).

Station: Indicates the type of terminal to which that specific port is connected.

blank = No station type (port unconfigured)
? = Unknown station type (no station has connected yet)
v = Video display station
p = Printer station
h = Host station

Line: Indicates the number of parity, framing, and overrun errors that have been recorded on that particular port.

. = 0 errors recorded.
: = 1—50 errors recorded.
| = 51—100 errors recorded.
* = Over 100 errors recorded.

Host/term: Indicates the type of host with which the terminal is presentiy communicating.

When STATION type is "v" (video) or "p" (printer) and the Host/term line is:

blank = No current host connection (if STATUS = 0 or -).
blank = On connection menu (if STATUS = 1).
3 = Connection to 3270 host.
A = Connection to ASCII host.

When STATION type is "h" (host) and the Host/term line is:

blank = No terminal is currently connected to this host port.

(If STATUS = 1, the attached terminal is either on the connection menu or awaiting the next connection.)

(If STATUS = 0, the attached terminal has either powered off or connected to another host destination.)

3 = A 3270 terminal is connected to this host.
A = An ASCII terminal is connected to this host.

LU: Indicates whether or not the SNA session is bound and active.

blank = Session is not bound.
+ = Session is bound (on at least one logical terminal).

Test 12, Option 4

Option 4 provides a facility to display the error counters for a particular Asynchronous Emulation Adapter port. The following panel is an example of a disabled adapter and a disabled port.

```
                ____Error Counters for PN 02, HG 21____

  Adapter (HG) status:          Disabled
  Port (PN) status:             Powered off due to error
  Error counters-

    Framing error:     12345
    Overrun error:     54321
    Parity error:      11111
    Loopback error:    12129

  To go directly to other tests, enter: /Test,Option
  Select test; press ENTER ===>_



  PF:  3=Quit                  12=Test menu
```

Figure 2-53. AEA Error Counters Example: Disabled Adapter and Disabled Port

Test 12, Option 5

Option 5 provides a facility to display the connectivity for a particular Asynchronous Emulation Adapter port. The following panel is an example of an enabled adapter and a display/printer connected to an ASCII host.

```
                _____Connectivity for PN 02, HG 21_____

Adapter (HG) status:            Enabled
Port (PN) status:               Powered on
Device type:                    Video display

Line speed/Parity               1200 / Odd
Flow control/Stop bits          XON/XOFF(XON) / 1

Current connectivity-

       LT    LT Addr            HG_PN    Host/Station Name

       1     n/a                21_      ASCII HOST

To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-54. Connectivity: Enabled Adapter and Display/Printer with an ASCII Host

Test A: Operator-Originated Alerts

Network Problem Determination Aid (NPDA) provides support for 20 product-unique panels that can be defined by the customer in the NPDA data base as part of the host SYSGEN process.

During configuring, one of the following options is selected:

- No alert function
- An alert function without operator-generated alert message capability
- An alert function with operator-generated alert message capability from all ports
- An alert function with operator-generated alert message capability from port 0 only.

When properly filled in, the information on such a screen is transmitted as part of an alert Network Management Vector Transport (NMVT) inbound to the host.

Included in these alert request units (RUs) are the customer-specified user-action code, a 120 (maximum length) test message, and up to three 8-digit qualifiers.

Once the alert is received by NPDA, the user-action code is mapped into one of the unique customer screens. The text message and qualifiers allow the operator to pass such things as a 3174 status code, a port number, and a telephone number, as well as a text message, up to the NPDA operator.

When an authorized display station operator enters TEST mode, types in **/A**, and presses the ENTER key, the following panel is displayed:

```
 /A
XX
------------------------------------------------------------------------
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn ----------------------------
Q1 mmmmmmmm Q2 mmmmmmmm Q3 mmmmmmmm
```

where,

/A	indicates the alert screen is ready for transmission when the Enter key is pressed.
XX	is a two-character field for the user-action code (01 – 20 decimal required).
nnnn...	is a 120-character field filled with nulls for the text message (optional).
mmmm...	are three 8-character fields filled with nulls for the qualifiers (optional).

When the ENTER key is pressed with the above panel, a check is performed to ensure that the user-action code (XX) is a number between 01 and 20 (decimal). If the number is between 01 and 20, the number is translated by the 3174 into the appropriate user-action code and an alert is sent. If an invalid user-action code is entered, the wrong number indicator is displayed in the operator information area.

After an operator-generated alert is sent, the display screen is cleared to prevent accidental retransmission of the message. Only one *operator-generated* alert may be pending with the 3174 at one time. For example, several authorized display station operators may request an alert screen simultaneously. Once an operator fills the screen with the required user-action codes (and any optional text and qualifiers) and presses the ENTER key, that entry is queued for transmission, provided no operator-generated alert is already pending. If a second authorized operator attempts to enter an alert before the first operator-generated alert is transmitted to the host, the second operator's entry is inhibited, the screen is *not* cleared, and the minus function indicator is displayed in the operator information area. The second operator must press the RESET key and try again. If the first operator's screen has been transmitted and no other operator has entered an alert, the second operator's entry is honored.

Regardless of the upstream response, the screen is cleared. If a link-level error occurs, the hardware will attempt retransmission of the alert. If the data has been lost because of an error above the link level (DACTPU), the information may be lost without any error indication to the operator.

If an attempt is made to request an operator-generated alert screen from an unauthorized display station, the operator unauthorized indicator is displayed in the operator information area.

If other than the basic characters have been entered from the keyboard, the try again (X ? +) indicator is displayed.

If a communication check is detected, the Input Inhibited and Communication Reminder symbols, followed by a 5xx number, are displayed.

Test D: Distributed Function Terminal Dump

You may request a dump of a distributed function terminal, such as a 3290, from a 3278 or similar display station. For example, after a 3290 has been downstream-loaded and a failing symptom is present, remove the diskette from diskette drive 1 or 2, and insert the 3174 dump diskette (P/N 73X3726). When the diskette is removed from the 3174, a status code of 38X may appear in the Status indicators. This is a normal indication and stops when the dump diskette has finished loading its control program into controller storage.

Perform the following steps to request a dump of a distributed function terminal.

1. Remove the diskette from drive 1 or 2 and insert the 3174 dump diskette.
2. At an attached terminal, press and hold ALT; press TEST.
3. Type in **/d,n** (n = The port number of the DFT). When the request is successfully received and the dump is initiated, a plus sign (+) will appear adjacent to the n:

   ```
   /d,n+
   ```

   While the dump is in progress, alternating codes 4671 and 4672 display in the Status indicators on the 3174. After approximately 10 minutes, the dump is completed and a 4675 is displayed in the 3174 Status indicators.
4. Remove the dump diskette.
5. Reinstall the previously removed diskette.
6. Exit test mode.

The terminal for which the dump was taken requires a power-on reset. This ensures a new downstream load of that terminal.

Note: Only one DFT dump is allowed at any given time. If a request is entered for a port that is powered off and does not have a DFT connected (this is a valid request), a DFT dump cannot take place. In approximately 20 seconds, a timer will abort the dump request and clear the DFT dump facility resource. During these 20 seconds, if another dump request is entered, a wrong number indicator appears in the indicator row.

If the DFT dump test request is rejected, one of the following may appear.

X–f appears if another DFT dump is already in progress.
/d,n– appears if a 3174 dump diskette is not available in one of the controller diskette drives.
X #? appears if the terminal that was selected to be dumped is not a distributed function terminal.

Online Tests Configuration B

Introduction

The online tests are in two sections. One set of Online Tests is for microcode that is Configuration Support A and S (see page 2-163). The other set is for microcode that is Configuration Support B. If you are not sure of your 3174 microcode release level, select online test 5, option 1 (/5,1). The release level will be displayed on the screen.

Configuration B online tests has three modes: 1TEST, 2TEST, and 3TEST. You determine which test mode you are in by the number preceding the word "TEST" in the operator information area of the screen (1TEST, 2TEST, or 3TEST) or by selecting the host ID when selecting a test option. 1TEST is for host IDs 1A through 1H, 2TEST is for host ID 2A, and 3TEST is for host ID 3A. If Concurrent Communication Adapters are not installed, only TEST will appear in the operator area of the screen.

Not all tests and options are available on 2TEST and 3TEST. If you select a test or option that is not available the following error messages will be displayed.

```
4610 This function is not supported for this configuration
4626 This function is valid for 1TEST only
4626 This function is valid for 2TEST only
4626 This function is valid for
3TEST only
```

Online tests are selectable from any 3278, 3279, or similar display attached to the controller. These tests are *not* selectable from distributed function terminals, such as a 3290. This test facility can be used during normal subsystem operation and is available after entering test mode. Test mode is entered by pressing the ALT and TEST keys simultaneously on an attached display station keyboard. The following tests can be selected by entering one of the test formats shown below or from the 3174 Test Menu shown in Figure 2-55 on page 2-226.

Test 0 (Terminal Check): Provides a facility to test a terminal's base and feature hardware. Test 0 also identifies the hardware group and port number of the terminal requesting the test. For detailed information about Test 0 see page 2-228.

/0 – Test 0 runs on the terminal being used to run tests.

Test 1 (Display Event Logs and Response Time Log): Event records for displays, printers, adapters, and processor logic are displayed. Also provides a response time monitor log. For detailed information about Test 1, see page 2-229. The following types of error logs can be displayed:

/1,1,n	– Response time log for host ID n (n = 1A—1H, 2A, 3A)
/1,2	– All event log: Error statistics for the 3174
/1,3,n	– Hardware group: Error statistics for a specific hardware group
/1,4,n	– Error statistics for a specific terminal port
/1,4,n,m	– Error statistics for a specific terminal port of a specific hardware group
/1,5,xxxx	– Status code: Error statistics for a specific status code
/1,6,n	– Logical terminal: Error statistics for a specific logical terminal
/1,6,n,m	– Logical terminal n host ID m (n = 0—254, m = 1A—1H, 2A, 3A)
/1,7	– Change log mode (Normal/Intensive)
/1,8	– Event log summary
/1,9,n	– Host ID (n = 1A—1H, 2A, 3A)

Test 2 Display Configuration Panels: Provides both hardware and microcode configurations on the controller For detailed information about Test 2, see page 2-235.

/2,1 – Hardware configuration: The hardware configuration is displayed.
/2,2 – Configuration questions: The panels presented during configure (except panel 118) are displayed.
/2,3 – Device definition: Printer Authorization Matrix and/or Logical Terminal Assignment panels are displayed.
/2,4 – Asynchronous Emulation Adapter configuration: The Asynchronous Emulation Adapter configuration is displayed.

Test 3 (3270 Device Status Summary): The status of all terminal adapter (HG 26) attached devices is displayed. For detailed information about Test 3, see "Test 3 Configuration B: 3270 Device Status Information" on page 2-237.

/3,1 – Status Summary is displayed.
/3,2,n – Error counters for port n (n=0-31) are displayed.
/3,3,n – Connectivity for port n (n=0-31) is displayed
/3,4,n – LU Status Summary for host IDn (n=1A—1H, 2A, and 3A) is displayed.

Test 4 (Reset Logs and Cable Errors): Resets the event log, traces, cable errors, and the response time monitor log. For detailed information about Test 4, see page 2-243.

/4,1,n – Resets the response time logs for host ID n
/4,2 – Resets the event log, traces, and cable errors
/4,3 – Resets the cable errors.

Test 5 (Display Vital Data): Provides the following 3174 information:

Model Number
Controller ID (serial number)
Microcode functional release level
Microcode maintenance release
Installed microcode patches
Installed RPQs
DSL information.

For detailed information about Test 5, see page 2-244.

/5,1 Display Controller Vital Data
/5,2,n,m Display Port Vital Data

Test 6 (Display Control Blocks): The port control areas and host control data are displayed. Can also display all logical terminal extensions (if any). For detailed information about Test 6, see page 2-247.

/6,1,n – Register page
/6,2 – The port control area information for the requestor's port is displayed.
/6,2,n,m – The port control area information for a specific port and hardware group is displayed.
/6,3 – X.25/X.21 SHM Host Control Data
/6,4,n,m – LT n Control Area on Host ID m (n=0—254, m=1A—1H, 2A, 3A)

Test 7 (Color Convergence): For more information, see page 2-259.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-259.

Test 9 (Token-Ring Tests): Provides the ability to display the status of the Token-Ring network, the Token-Ring adapter status counters, and attached links. Test 9 also provides the ability to reset the Token-Ring network and attached link status counters. For detailed information about Test 9, see page 2-260.

/9,1 – Monitor Token-Ring status.
/9,2 – Display Token-Ring adapter status summary.
/9,3 – Reset Token-Ring adapter status counters.
/9,4 – Display link status summary for all links.
/9,5,n – Display link status summary for link address n.
/9,6 – Reset link status counters for all links.
/9,7,n – Reset link status counters for link address n.
/9,8 – Display gateway host status summary.

Test 10 (Port Wrap Tests): Provides a port wrap test for terminal adapter ports (00, 08, 16, 24), TMA ports 00–31, and 3299 Model 2 and 3 ports 00–31. For detailed information about Test 10, see "Test 10 Configuration B: Port Wrap Tests" on page 2-270.

/10,1,n – Direct wrap for a specific terminal adapter port
/10,2,n – 3299/TMA port wrap

Test 11 (Trace Control): Provides an internal trace capability. This function is available only to service personnel. See "Test 11 Configuration B: Trace Control" on page 2-271.

Test 12 (Asynchronous Emulation Adapter Tests): Provides access to a test for an Asynchronous Emulation Adapter Terminal, port, or smart-modem. It also provides a status summary and capability to reset error counters on any or all Asynchronous Emulation Adapters. For detailed information on Test 12, see page 2-274.

/12,1 – AEA Port Tests Menu
/12,2 – Display status summary
/12,3 – Reset line errors on all AEA HGs
/12,3,n – Reset line errors on HG n.
/12,4,m,n – Display error counters for port m on HG n (m=0-7, n=21-23)
/12,5,m,n – Display connectivity for port m HG n (m=0-7, n=21-23)

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controllers.

/A,n – Alerts to host n (n=1A—1H, 2A, 3A)

For detailed information about Test A, see page 2-281.

Test D (Dump Device): Provides a device dump capability for distributed function terminals such as a 3290. For detailed information about Test D, see page 2-283.

/D,n – DFT dump for port n.

3174 Test Menu Configuration B

To display the 3174 Test Menu, shown in Figure 2-55, perform the following steps at any 3278 or similar display.

1. Press and hold ALT. Press TEST.
2. Press PF12, or CLEAR, or PA2.

```
                        _____ 3174 Test Menu _____

   Test        Description

    0          Terminal check
    1          Display event logs and response time log
    2          Display configuration panels
    3          3270 device status information
    4          Reset logs and cable errors
    5          Display vital data
    6          Display Control Areas
    7          Color convergence
    8          Extended functions and program symbols
    9          Token-Ring tests
   10          Port wrap tests
   11          Trace control
   12          Asynchronous emulation adapter tests
    A,n        Alerts to host n (n=1A-1H, 2A, 3A)
    D,n        Dump device on port n (n=0-31)


  Select test;  press ENTER ===>_

  PF: 3=Quit
```

Figure 2-55. 3174 Test Menu

Online Test Format

The general format for all online tests is /t,s,n,m, where:

t = test number
s = option number for tests that have menus, such as test 1
n,m = value(s) required by some test menus.

For example:

A test entry of **/1,2** will display all log records.
A test entry of **/1,3,2** will display the log records for HG02.

These tests can also be selected by entering the following:

Example 1

1. From any select line, enter **/1**
   The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter **2**
   All log records are displayed.

Example 2

1. From any select line, enter **/1**
   The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter **3,2**
   The log records for HG02 are displayed.

Test 0 Configuration B: Terminal Check

This test may be run from 1TEST, 2TEST, and 3TEST and it provides a facility to test the requesting terminal's basic functions (such as highlighting, nondisplay, and insertion), as well as feature functions (such as light pens, magnetic card readers, and scanners).

To request Test 0, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in the following:
   - **/0** or **/**
   - Press ENTER.
     The test pattern shown in Figure 2-56 is displayed.

```
                        ____Terminal Check____

        3174 Controller
        Hardware Group       nn
        Port Number          mm


                       ?SEL PEN               SEL PEN
                            &SEL PEN               >SEL PEN
                       NON DISPLAY              INSERT CK




    To go directly to other tests, enter:  /Test,Option
    Select test;  press ENTER ====> __

PF:   3=Quit                              12=Test menu
```

WHERE:

nn = The adapter HG number of the terminal that requested the test.
mm = The port number of the terminal that requested the test.
NON = The nondisplay field that should not appear on the screen.

Figure 2-56. Test 0 Display Pattern

The following terminal functions are tested:

- High-intensity function
- Nondisplay function
- Selector pen (if one is attached)
- Various key functions and modes
- Four-color function and base-color switch capability on a 3279 or similar color display station
- Audible alarm (if one is attached).

Test 1 Configuration B: Display Logs Menu

Test 1 provides a response time log and event statistics for terminals, hardware groups, and ports. To select a specific event log from the Logs Menu, shown in Figure 2-57, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/1**
3. Press ENTER; the Logs Menu is displayed.
4. To display a specific event log, type in the option number of the desired log and press ENTER.

```
                          _____ Logs Menu _____

Option      Description             (Current log mode:  Normal )

  1,n       Response time log for host ID n (n=1A-1H, 2A, 3A)
  2         All events logged
  3,n       Hardware group (n=0-99)
  4,n,m     Port n, hardware group m (n=0-31,m=0-99)
  5,xxxx    Status code (replace x's with search digits)
  6,n,m     Logical terminal n host id m (n=0-254, m=1A-1H, 2A, 3A)
  7         Change log mode (normal/intensive)
  8         Event log summary (by category and hardware group)
  9,n       Host ID (n=1A-1H, 2A, 3A)

To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _



PF:  3=Quit                                   12=Test menu
```

Notes:

1. For Models 1L through 13R, valid terminal adapter port numbers are 0 to 31.
2. For Models 51R through 63R, valid terminal adapter port numbers are 0 to 15.
3. For Models 81R through 92R, valid terminal adapter port numbers are 0 to 7.

Figure 2-57. Test 1 Menu

Option 1. Type **1,n** to select option 1 from the Logs Menu. The resulting panel shows the response time monitor (RTM) log if the controller is configured for RTM.

Option 2—6.These options can only be run from 1TEST. Similar panels are displayed when options 2, 3, 4, 5, or 6 are selected from the Logs Menu. The difference in the format of the log record panels is the title line. Each panel contains the menu selection and the specified parameter value. If no event record exists for the requested event log, a `No entries were found` message is displayed. To select a log record from the Logs Menu, enter one of the following test requests:

2 `All events logged`. All the errors in the event log are displayed.
3,n (n = a specific hardware group number from 0 to 99) All errors in the event log for the hardware group selected are displayed.
4,n,m (n = a specific terminal port number from 0 to 31; m = a specific hardware group number from 0 to 99) all errors in the event log for the port number on the specific hardware group selected are displayed.

5,xxxx (the x's are replaced with a status code). Four characters must be entered. An x can be used as a "don't care" character. For example: On the select line on the Logs Menu panel, enter **5,x501**. The event log will be searched, and all the 501 status codes that occurred since the last time the logs were reset will be displayed.
6,n,m (n = a specific logical terminal number from 0 to 254, m = a specific host ID number from 1A to 1H, 2A, or 3A) all errors in the event log for the logical terminal number on the host ID that was selected are displayed.

Notes:

1. 1A to 1H identifies from one to eight hosts that can be configured for the Token-Ring Adapter on Models 3R, 13R, 53R, and 63R. This also applies to any model that can be alternately configured to simulate a Model 3R, 13R, 53R, and 63R. See the *3174 Planning Guide* for details.
2. 2A or 3A identifies a host link through a Concurrent Communication Adapter

Option 7. This test can only be run from 1TEST. Type a **7** to change the log mode from **Normal** to **Intensive** and from Intensive back to Normal. The current log mode is noted on the Test 1 Menu screen. Normal is the mode regularly used for logging errors. Intensive was created to record those high-frequency loggable errors that are not recorded in Normal mode. Because of the high frequency of the errors, Intensive mode should only be used when needed. To guard against continued use, the controller will change the log mode back to Normal when a 76-hour timer expires.

Option 8. This test can only be run from 1TEST. Type an **8** to display the Event Log Summary. Option 8 provides a single panel of error log summary information available through the /1 test in 3174 online TEST MODE. All current log records, both internal and on diskette or fixed disk, are divided into the following event categories. A breakdown by Hardware Group (HG) is under each category. See Figure 2-58.

Option 9. Type **9,n** (n = 1A—1H, 2A, 3A) to display all events logged for a specific Host ID.

```
                    _____ Event Log Summary _____

 Category   Machine    Program    Comm       Media     Port        Other
            Check      Check      Check      Check     Check

 Total         2          1          2          6         4           12

 Subtotal
 by         HG      |  HG     |  HG     |  HG     |  HG     |  HG
            26  1   |  00  1  |  16  2  |  02  2  |  26  4  |  02  2
            00  1   |         |         |  99  3  |         |  26  10
                    |         |         |  01  1  |         |


To go directly to other tests, enter:  /Test,Option
Select test:  press ENTER ===>_

 PF: 3=Quit            12=Test menu
```

Figure 2-58. Event Log Summary (Example)

Log Records Example

Figure 2-59 illustrates the panel displayed if you select option 4 with a specific port number and hardware group.

```
                          _____ Log Records - All _____

(Day/Time since last POR: 000/08:11)
Day Time   SC    QA  PHG_PN   CHG_PN  ID   HA  Extended data bytes (B1-B16)
                                              B1   B3   B5   B7   B9   B11  B13  B15
000 08:11  0331  51  11               1A       9025 1100 01
000 00:05  0384  05  99               1B       0387 0385
000 00:03  0500  01  16               1C
000 00:02  0532  10  11
000 00:02  3174  01  00
015 21:48  0402  02  16      26_02    2A   002 0000 0003 F350 0000
015 21:22  0401  03  16      26_02    3A   006 0001 0004 3c40 4000
015 21:20  0209  51  26_08   16       2A   008
015 21:19  0201  51  26_08   16       2A   008
015 21:07  3174  01  00
015 20:01  0311  01  87                    9051 0500
015 19:14  0807  20  22_04   26_00    1D       0000 0000 0000 0000 02

PHG_PN=Primary HG_PN   HG=Hardware Group  SC=Status Code  ID=Host ID
CHG_PN=Connection HG_PN  PN=Port Number  QA=Qualifier  HA=Host Address

To go directly to other tests, enter: /Test,Option
Select test; press ENTER====>_

PF: 3=Quit              8=Fwd          12=Test Menu
```

Figure 2-59. Log Record Display Panel

Day/Time

The Day/Time value indicates the setting of the 3174 interval timer when the request to display the log is entered. Since the interval timer is reset to zeros when the controller is powered off and on, it also indicates the elapsed time since the power-on occurred. This timer can be set to the actual time of day using an offline test. The day value range is 000 to 255 and is increased by 1 every 24 hours. The time field is specified as 00 hours through 23 and 00 minutes through 59.

The Day/Time represents the day and time with respect to power-on when the log event occurred. :

SC Field

SC = The base status code that was logged. See the *3174 Status Codes*, GA27-3832, for the recovery action.

QA Field

QA = The qualifier associated with the base status code.

PHG and CHG Fields

PHG (Primary Hardware Group) and CHG (Connection Hardware Group) = The hardware group associated with the error that occurred. The PHG field contains 00 or 99 if the error is not associated with a particular hardware group, or if the hardware group cannot be identified. The values 00 and 99 are not displayed in the CHG field. An example of this would be a 3278 terminal attached to a TMA in a 3174 Model 1L. The

PHG would be HG26 and the CHG would be HG16. The hardware groups for all models of the 3174 are shown in Table 2-19.

Table 2-19. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	23	Asynchronous Emulation Adapter
01	Diskette Drive 1/File Adapter	26	Terminal Adapter
02	Diskette Drive 2/File Adapter	26	Terminal Multiplexer Adapters
03	Fixed Disk 1/File Adapter	31	Token-Ring Adapter
04	Fixed Disk 2/File Adapter	46	Encrypt/Decrypt Adapter
08	Timer	51	Concurrent Communication Adapter
09	Operator Panel	52	Concurrent Communication Adapter
11	Communication Adapter	80	Test Monitor
16	Channel Adapter	81	Test All CSU Mode
16	Channel Driver/Receiver	82	Test All Installed Mode
21	Asynchronous Emulation Adapter	87	Processor/Storage
22	Asynchronous Emulation Adapter	99	Unassigned Hardware Group

PN Field

PN = The port number (PN) is used in conjunction with the PHG and CHG fields in the Log Records menu. This field is not displayed at the operator panel.

The Hardware Group 26 port numbers for the 3174 Models 1L through 13R range from 0 to 31. The Hardware Group 26 port numbers for 3174 Models 51R through 63R range from 0 to 15. The Hardware Group 26 port numbers for 3174 Models 81R through 92R range from 0 to 7.

ID Field

ID = The identifier of the host that was active when the status code was logged.

HA Field

HA = The Host Address, if the error is related to attached terminals. Certain terminals may use multiple logical terminals, such as a 3278.

Extended Data Fields (B1—B16)

The extended data fields contain supplementary information that may be useful to resolve a problem, such as TYPE and LOCA of the failing FRU, or the failing bytes in a data stream error. To determine the definition of the extended data (B1 – B16), see the *3174 Status Codes*, GA27-3832. The extended data field in the status code chart correlates to this field. See the following example on how to correlate a log entry to the *3174 Status Codes*:

Log Entry = 0504 0511 00 9253 22

0504 = Status code
0511 = Qualifier and hardware group
00 = PN (none associated with this log entry)
9253 = FRU Type number
22 = Location of the FRU

To find this status code in the status code chart, look for status code 0504 with a QA field of 05.

Status Code Entry = 0504 05HG B1B2 B3B4

0504 = Status code
05HG = Qualifier and hardware group
B1B2 = FRU Type Number
B3B4 = Location of the FRU

Note that the PN field is not shown in the status code chart.

Test 1, Option 1

If the 3174 has been configured for local display of the RTM log or the host has enabled this function, the /1,1 Test allows an operator to show the RTM log on authorized displays (except terminals such as the 3290).

Type **1,n** (n = 1A—1H, 2A, 3A) to select the Response Time Monitor (RTM) from the Logs Menu. An example of the Response Time Monitor log is shown in Figure 2-60.

```
                        _____ Response Time Log - Host ID xx ___

LT  DEFINITION  CTR#1    BDY#1    CTR#2    BDY#2    CTR#3    BDY#3    CTR#4    BDY#4    OVER
001 i  b  d3    00000  11:01.0    00000  10:12.0    00000  11:15.0    00000  11:10.0    00000
002 _  b  d3    00000      0.5    00000      2.0    00000      5.0    00000     10.0    00000
003 p     3     00000      1.0    00000      2.0    00000      5.0    00000     10.0    00000
004 v  b  d1    00000      1.0    00000  11:01.0    00000      5.0    00000     10.0    00000
005 i  d  d2    00000      1.0    00000      2.0    00000      5.0    00000     10.0    00000
006 v     3     00000      0.5    00000      2.0    00000  11:01.0    00000     10.0    00000
007 v  b  d3    00000      1.0    00000      2.0    00000      5.0    00000     10.0    00000
008 i  b  ?3    00000      1.0    00000      2.0    00000      5.0    00000  11:01.0    00000
                                          DEFINITION

p = printer             b = BDYs set by host              1 = Time to First Character
i = Intelligent device  d = DEF set by host               2 = Time to Keyboard Unlocked
_ = Never powered on    ? = disabled by host              3 = Time to CD/EB
v = Video display                                         4 = Time to last character

To go directly to other tests, enter: /Test, Option
Select test; press ENTER ===>_

PF: 3=Quit     7=Back      8=Fwd         12=Test menu
```

Figure 2-60. RTM Log Configuration Support B

The example shows representative information for the first eight logical terminals. If the 3174 is not customized for RTM, the display station keyboard is inhibited. Each time the PF8 key is pressed, the next group of eight terminals is displayed.

CTR#1 = First-counter response time = 0 up to BDY#1 value
CTR#2 = Second-counter response time greater than BDY#1 up to BDY#2 value
CTR#3 = Third-counter response time greater than BDY#2 up to BDY#3 value
CTR#4 = Fourth-counter response time greater than BDY#3 up to BDY#4 value
BDY#1 = First boundary in minutes and seconds
BDY#2 = Second boundary in minutes and seconds
BDY#3 = Third boundary in minutes and seconds
BDY#4 = Fourth boundary in minutes and seconds
OV = Overflow (response time exceeding last boundary).

Note: The displayed boundaries are rounded to the nearest tenth of a second.

Reset the Response Time Monitor

The operator at an authorized display can reset the RTM logs of all configured devices. All log information is reset except the customized boundaries, the customized RTM definitions, and pending transaction status. In test mode, entering **/4,1** resets the RTM log. When the reset is completed, a completion message appears on line 23.

If the 3174 is not customized for RTM, when **/4,1** is entered, a message appears stating the function is not supported for this configuration. See "Test 4 Configuration B: Reset Logs and Cable Errors" on page 2-243.

Test 2 Configuration B: Configuration Menu

This test can only be run from 1TEST. Test 2 provides information about hardware configuration, configuration questions, the printer authorization matrix, logical terminal assignment, and the Asynchronous Emulation adapter configuration. When Test 2 is selected, the menu shown in Figure 2-61is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/2**
3. Press ENTER; the Configuration Menu is displayed.
4. Type in the option number.
5. Press ENTER.

```
                    _____ Configuration Menu _____

  Option        Description


    1           Hardware configuration
    2           Configuration questions
    3           Device Definition
    4           Asynchronous Emulation Adapter configuration




To go directly to other tests, enter:  /Test,Option
Select Option, press ENTER ====> __

PF:  3=Quit                              12=Test menu
```

Figure 2-61. Test 2 Menu

Option 1. The panel shows the hardware configuration. See Figure 2-62 on page 2-236.

Option 2. The configuration panels displayed during configuration (except panel 118) are displayed.

Option 3. If the 3174 is configured for Printer Authorization Matrix and Logical Terminal Assignment, the PAM panel is displayed first and then the LTA panel is displayed. If the 3174 is configured for just PAM or LTA only that panel(s) is displayed.

Option 4. The asynchronous emulation adapter configuration panels are displayed.

For more information about Options 2, 3, and 4, see the *3174 Utilities Guide*, GA23-0214.

Test 2, Option 1

The following panel is displayed.

```
                 _____Hardware Configuration Table_____


HG TYPE LC DESCRIPTION          SC      HG TYPE LC DESCRIPTION        SC
00 9001 00 Invalid Card/Cond            21 9540 61 AEA Cable Assembly
01 9110 01 Diskette 1 - 1.2MB           22 9540 62 AEA Cable Assembly
02 9110 02 Diskette 2 - 1.2MB           22 9333 13 Asynch Emul Adpt
03 9132 03 Fixed Disk 1 - 20MB  32XX    23 9333 12 Asynch Emul Adpt
04 9132 04 Fixed Disk 2 - 20MB          23 9540 63 AEA Cable Assembly
08 9500 18 Timer                        26 9154 21 Terminal Adapter
09 9010 05 Ops Panel Adpt               26 9172 12 Term Mpx Adpt 24-31
09 9521 06 Ops Panel Assembly           26 9172 16 Term Mpx Adpt 08-15
11 9253 22 Type 1 Com Adpt-XXX          31 9350 12 Token-Ring Adpt 4Mbps
16 9210 11 Channel Adpt                 87 9053 19 Storage 2MB
16 9230 10 Channel Drv/Rcvr
21 9333 14 Asynch Emul Adpt

Select Test; press ENTER ====>_

PF: 3=Quit                12=Test Menu
```

Where:

HG = Hardware group
TYPE = FRU Type number
LC = FRU location
SC = Status code This field contains a 32XX number only if a problem has occurred with a FRU during an IML.

Note: This table shows the configuration for Model 1L. Only those FRUs that are physically installed are displayed in this table.

For the communication adapters, the XXX = one of the following:

WRP = EIA/V.35 wrap plug is connected
V.35 = V.35 cable is connected
EIA = EIA cable is connected
NC = Nothing is connected
X.21 = X.21 cable is connected
WRP = X.21 wrap plug is connected
INV = An undefined cable or wrap plug is connected.

Figure 2-62. Hardware Configuration Table

Test 3 Configuration B: 3270 Device Status Information

Test 3 provides the status of all configured devices. The 3270 Device Status Menu panel shown in Figure 2-63 is displayed. The Control diskette must be installed and a normal IML has to be completed before this test can be selected. If 2TEST or 3TEST is displayed, only Option 4 can be used. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Key in **/3**
3. Press ENTER.

```
                    _____ 3270 Device Status Menu _____

  Option        Description

    1           Display status summary
    2,n         Display error counters for port n (n=0–31)
    3,n         Display connectivity for port n (n=0–31)
    4,n         Display LU status summary for host ID n (n=1A– 1H, 2A, 3A)




To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-63. 3270 Device Status Menu

Test 3, Option 1

This test is only available from 1TEST. The following panel is displayed.

```
                    _____Status Summary - HG 26_____

Port     00  02  04  06  08  10  12  14  16  18  20  22  24  26  28  30
Address    01  03  05  07  09  11  13  15  17  19  21  23  25  27  29  31

Attach   m m m m m m m m d               m m m m m m m m m m m m m m m m
Status   1 1 1 1 0 0 1 0 1 0 0 0 0 0 0 0 - - 1 0 1 1 1 0 1 0 0 1 0 0 1
Terminal e c v v ? v v v p                 e p p v v e v v v v i i v v v
Cable    . . . . . . : . .                 | . . . | . . . . . . . . .
Cable Max. . . . . * : . .                 | . . : * . : . . . .   : : *

  d = direct       - = off(error)       i = DFT device     . = 0 errors
  m = multiplexor  c = combined         e = Reserved       : = 1-5 errors
  x = unconfigured p = printer          ? = unknown        | = 6-15 errors
  1 = on           v = video display                       * = > 15 errors
  0 = off


To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF:  3=Quit                                    12=Test menu
```

Figure 2-64. Status Summary

Port Address: indicates the terminal port number.

For Models 1L through 13R, ports 00 – 31 are displayed.
For Models 51R through 62R, ports 00 – 15 are displayed.
For Models 81R through 92R, ports 00 – 07 are displayed.

Attach:

d	=	The terminal is attached directly to the terminal adapter.
m	=	The terminal is attached through a 3299 Terminal Multiplexer.
M	=	A terminal that is attached to this controller through a 7232 dual control unit terminal multiplexer.
x	=	A terminal that is configured only for another controller through a 7232 dual control unit terminal multiplexer. That terminal will not communicate with this 3174.
?	=	When displayed on this line under port 00, a question mark (?) means one of the following:

- The controller has not communicated with a directly attached terminal.
- The controller has not communicated with any of the terminals connected to a 3299.

Status: Indicates one of the following conditions on the configured terminals at the time the test request was entered:

1	=	The attached terminal is communicating with the 3174.
0	=	The attached terminal is powered off or disconnected.
-	=	The terminal had been communicating with the 3174, but the terminal is now disabled from the controller because of errors. Run Test 1, Option 4 (Event Log) and check for any 2XX status codes logged against the port number that was disabled.
s	=	The terminal is presently communicating with another controller through a 7232 dual control unit terminal multiplexer, in other words, it is in the switched state.

Terminal: Indicates the type of device connected.

?	=	The device attached to this port has not been communicating with the 3174. The terminal on this port may not have been powered on. To reset this condition at the terminal: set the Normal/Test switch to Test and back again, or perform a power-on reset.
v, p, or i	=	The display or video (v), printer (p), or DFT device (i) for this port has a known history of communicating with the 3174.

Note: If a terminal or multiplexer cable is disconnected and then reconnected, a terminal power-on reset is required to allow the 3174 to recognize the change. The terminal counter is reset by an IML, by a power-on reset on the attached terminal, or by online test 4.

Cable: Terminal errors that are caused by cable media-related problems are counted by the cable counter for each port address. The cable counters accumulate the number of cable transmission errors occurring in the most recent 30-minute time period. Every 30 minutes the cable counters are reset to 0 and error counting starts again. When any cable counter passes the threshold of 16 errors, status code 201 51 is recorded in the event log. The event log can be viewed to determine the number of cable errors that have occurred over an extended period of time. This log is displayed by using online test /1. The cable counters are also reset by an IML and online test /4 options 2 and 3. Individual cable counters are reset when the attached terminal is powered on.

Cable Max: The Cable Max counters retain the peak value attained by the Cable Threshold counters over an extended period. They are not reset every 30 minutes, but only are reset by IML and online test /4 options 2 and 3.

Test 3, Option 2

This option can only be run from 1TEST. The following panel is an example of the error counters for the port specified by the parameters.

```
              ____Error Counters for PN 02, HG 26____

Adapter (HG) status:            Disabled
Port (PN) status:               Powered off due to error
Error counters-

  Poll time out:      10
  Read time out:      10
  Poll parity:        10
  Read parity:        10
  Cable               40
  Cable Max           75

To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_



PF:  3=Quit                     12=Test menu
```

Figure 2-65. Error Counters Example: Disabled Adapter and Disabled Port

Test 3, Option 3

This option can only be run from 1TEST. The following panels are examples of connectivity. The status of the device determines which panel is displayed.

```
              _____Connectivity for PN 11, HG 26_____

Adapter (HG) status:            Enabled
Port (PN) status:               Powered on
Device Type                     Video display (MLT)

Current connectivity-
                    Host
       LT   Bound   Addr   IDn      HG_PN   Host/Station Name


      (No host connectivity configured)




To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_

PF:  3=Quit                     12=Test menu
```

Figure 2-66. Connectivity Example: Enabled Adapter and Host Unconfigured

```
              _____Connectivity for PN 11, HG 26_____

Adapter (HG) status:            Enabled
Port (PN) status:               Powered on
Device Type                     Video display (MLT)

Current connectivity-

                 Host
       LT  Bound Addr    IDn     HG_PN      Host/Station Name

       1    Yes  111     1A1       11         RALVM11
       2    n/a  n/a               21_02      DOW JONES
Active 3    n/a  n/a               22_07      THE SOURCE
       4                                      not connected
       5    No   100     2A2       51         RALVM29

To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_

PF:  3=Quit                    12=Test menu
```

Figure 2-67. Connectivity Example: Enabled Adapter and Live MLT Display

Test 3, Option 4

The following panel is an example of the LU Status Summary. The test you entered from (1TEST=1A—1H, 2TEST=2A, 3TEST=3A) will be reflected by the ID at the top of the panel.

```
                          _____ ID 2A LU Status Summary _____

Port     00  02  04  06  08  10  12  14  16  18  20  22  24  26  28  30
Address    01  03  05  07  09  11  13  15  17  19  21  23  25  27  29  31
Terminal  v v v c ? v v c p v v v v v v v v p p v v e e v v v v i i v v v
LU        + + +       +   +                   +           +     +



  p = printer       i = DFT device       + = in session
  v = video display e = Reserved
  c = Combined      ? = unknown


Connection number:  Outgoing call 999-555-1234

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF:  3=Quit                                  12=Test menu
```

Figure 2-68. Status Summary Panel (Example)

LU: This line is present only for 3174s running SNA. It indicates whether the SNA session is bound and active. For MLT ports, the + is displayed if any SNA session is active.

Connection Number: This number is for X.21 or X.25 lines. One of the following messages can follow the connection number:

Outgoing Call, followed by the number being called. For X.25, the outgoing call number (or host DTE address) can be up to 15 digits long. For X.21, the outgoing call number can be up to 32 characters long, as entered on the dial terminal.

Direct Call (X.21 only).

Incoming Call followed by an optional number. For X.25, the Incoming Call or Host DTE Address can be up to 15 digits long. For X.21, the Incoming Call will be displayed.

Note: See Figure 2-64 on page 2-238 for an explanation of other fields shown on the panel.

Test 4 Configuration B: Reset Logs and Cable Errors

Test 4 resets the response time logs, the event logs, traces, and cable errors. If 2TEST or 3TEST is displayed, use only Option 1,n. The menu shown in Figure 2-69 is displayed.

Warning: Do not select the options on this menu unless you want to reset all of your counters back to **zero**.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/4**
3. Press ENTER.

```
                          ____Reset Log Menu____

 Option        Description

   1,n         Reset response time logs for host ID n (n=1A-1H, 2A, 3A)
   2           Reset event log, traces, and cable errors
   3           Reset cable errors









To go directly to other tests, enter:  /Test,Option
Select option;  press ENTER ====> __

PF:  3=Quit                              12=Test menu
```

Figure 2-69. Test 4 Menu

Option 1,n. Select option 1,n on the Reset Log Menu to reset the response time log for a particular host (n = 1A—1H, 2A, 3A). If you are in 1TEST the host IDs will be 1A—1H, 2TEST will be 2A, and 3TEST will be 3A.

Option 2. This option is valid only from 1TEST. Select option 2 on the Reset Log Menu to reset the event logs, traces, and cable errors.

Option 3. This option is valid only from 1TEST. Select option 3 on the Reset Log Menu to reset only the cable errors.

Notes:

1. Cable errors can be reset on an individual port by performing a power-on reset on the terminal connected to that port.
2. To reset line errors on ASCII terminals, use Test 12, Option 3 or 4.

Test 5 Configuration B: Display Vital Data

Test 5: Controller information such as model number, serial number, and EC level is displayed. The menu shown in Figure 2-70 is displayed. Perform the following procedure at any 3278 or similar display station: If 2TEST or 3TEST is displayed, use only Option 1.

1. Press and hold ALT; press TEST.
2. Type in **/5**
3. Press ENTER.

```
                          _____ Vital Data Menu _____

Option       Description

1            Controller Vital Data
2,n,m        Port n vital data on HG m (n=0-31, m=21-23, 26)









To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Figure 2-70. Vital Data Menu

Option 1. Controller Vital Data Menu.
See Figure 2-71 on page 2-245.

Option 2. This option is valid only from 1TEST. Port Vital Data panel. See Figure 2-72 on page 2-246.

Test 5, Option 1

The following panel is displayed. This panel reflects the Vital Data for the host selected by the 1TEST (ID = 1A—1H), 2TEST (ID = 2A), or 3TEST (ID = 3A).

```
                    ____Controller Vital Data____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:          11R       Patches                    Active
Controller ID:         1234567                              RPQs
Microcode Release:     B1.0
Maintenance Release:   89186     123456  112361  112371    8K125
IML Drive/Type:        01/41     112344  112362  012372    7L123
                                 112343  112368  112369    7L124
DSL Information:                 112345  112373  112373    8K123
3290 01.02 0000000000            002222  012364  112374    8K123
3179 01.00 0000000000            112355  112365  112375    8K123
9999 01.00 0000000000            112356  002366  002376    8K123
9998 01.00 0000000000            012357  112367  112377    8K124

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Figure 2-71. Controller Vital Data

Note: If more than 30 patches are installed on the Control disk, PF8 = FWD will be displayed on this panel.

Help ## — This number is assigned by the customer in response to question 99 during customizing.

Model Number — The model number of the controller.

Controller ID — This ID is assigned by the customer in response to question 108 during customizing.

Microcode Release — This is the release level of the Control diskette. This is the configuration support release and suffix level of the Control disk. B is configuration support, 1 is the release level, and 0 is the suffix.

Maintenance Release — This is the year and Julian date that the microcode was released. 89 is the year, and 186 is the day in the year.

IML Drive/Type – This is the drive and the type of IML that was performed.

Drive Type

01 = Diskette drive 1
02 = Diskette drive 2
03 = Fixed disk drive 1
04 = Fixed disk drive 2.

IML Type

41 = Load production (default) operational microcode
42 = Load back level operational microcode
43 = Load trial operational microcode.

Patches – These are the patch ids that can be in effect for the current system configuration. Even though listed, a patch is only active if the configuration of the system allows the patch to function. A listed patch is not necessarily functional.

Active RPQs – These are the active RPQ ids that are in effect for the current system. Blank entries indicate no active RPQs.

DSL Information – This information describes one DFT device on each line. The terminal model type comes first, followed by the release level and suffix for the DFT microcode. The DFT RPQ is the last field. The syntax (the parentheses do not appear) is:

(Configuration level)(Release level)(Suffix level)(DFT RPQ)

Test 5, Option 2

The following panel is displayed.

```
                 _____Port Vital Data–PN 02, HG 26_____

Device Type:              3179
Model number:             G
Plant of manufacture:     *
Serial number:            *
Release level:            *
Engineering change date:  *
                                    B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
Device characteristics (hexadecimal):  03 1F 80

* = data not supplied by device


To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _


PF: 3=Quit                                  12=Test menu
```

Figure 2-72. Port Vital Data

Test 6 Configuration B: Display Control Blocks

Test 6 provides the following information. Option 2 Port Control Area contains common subsystem information pertaining to all terminals and devices, and the Host Control Data (Option 3) contains information on the host adapter. In addition, limited device feature information is provided. Options 2 and 3 represent the most current information about a specific device, and should be checked when it is necessary to determine specific device parameters, such as:

- Type and feature information for attached terminals.
- Is the display screen size correctly specified?
- Is a modified data tag (MDT) bit set?
- The type of keyboard for a specific terminal.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/6**
3. Press ENTER.

```
                    _____Display Control Areas Menu_____

Option          Description

  1,n           Register page n (n=0-3F)
  2             Port control area (Requestor's Port)
  2,n,m         Port n control area on HG m (n=0-31 m=21-23,26)
  3             X.21 SHM / X.25 Host Control Data
  4.n,m         Port Control Area for Host Address n on Host ID m
                (n=0-254 m=1A-1H, 2A, 3A)




To go directly to other tests, enter: /Test,Option
Select option;  press ENTER ===> _

PF:  3=Quit                                    12=Test menu
```

Figure 2-73. Test 6 Menu

Option 1,n. Register page (n = 0—3F)

Option 2. Select option 2 on the Display Control Blocks Menu to display the port control area for the requesting terminal.

Option 2,n,m. Select option 2,n,m to display the port control area for the terminal on port n of hardware group m.

An example of the Port Control Area panel is shown in Figure 2-74 on page 2-248. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-75 on page 2-249 for an example of an LT Control Area panel.

Option 3. Select option 3 on the Display Control Blocks Menu to display the host control data on controllers that are configured for X.21 or X.25. Figure 2-76 on page 2-255 shows the host control data for X.21 short-hold mode. Figure 2-77 on page 2-257 shows the host control data for X.25.

Note: This option only shows the correct XIDs sent and received during an X.21 short-hold mode session. XIDs exchanged before an SHM session is established are not included in the host control data.

Option 4,n,m. Select option 4,n,m (n=0—254, m= 1A—1H, 2A, 3A) to display the Logical Terminal Control Area for a selected host address on a specific host ID.

Notes:

1. 1A to 1H identifies from one to eight hosts that can be configured for the Token-Ring Adapter on Models 3R, 13R, 53R, and 63R. This also applies to any model that can be alternately configured to simulate a Model 3R, 13R, 53R, and 63R. See the *3174 Planning Guide* for details.
2. 2A or 3A identifies a host link through a Concurrent Communication Adapter

An example of the Port Control Area panel is shown in Figure 2-74. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-75 on page 2-249 for an example of an LT Control Area panel.

Test 6, Option 2

The following panel will display information about your terminal.

```
                ____Port Control Area - PN 17, HG 26____

Segment 00
     0      2      4      6      8      A      C      E
00   1111   2222   3333   4444   1111   2222   3333   4444
10   0000   1234   1234   1234   1234   1234   1234   1234
20   1234   1234   1234   1234   1234   1234   1234   1234
30   1234   1234   1234   1234   1234   1234   1234   1234
40   1234   1234   1234   1234   1234   1234   1234   1234
50   1111   2222   3333   4444   1111   2222   3333   4444
60   0000   1234   1234   1234   1234   1234   1234   1234
70   1234   1234   1234   1234   1234   1234   1234   1234
80   1234   1234   1234   1234   1234   1234   1234   1234
90   1234   1234   1234   1234   1234   1234   1234   1234
A0   1234   1234   1234   1234   1234   1234   1234   1234
B0   1111   2222   3333   4444   1111   2222   3333   4444
C0   1234   1234   1234   1234   1234   1234   1234   1234
D0   1235   1234   1234   1234   1234   1234   1234   1234
E0   1234   1111   4444   3333   1111   2222   3333   2222
F0   1234   1234   1234   1234   1234   1234   1234   1234

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit           8=Fwd              12=Test menu
```

Figure 2-74. Port Control Area Panel

Note: To analyze the information contained on this panel, see "Port Control Area Bit Definitions" on page 2-250.

Type **2,n,m** to select option 2,n,m. The following panel will display information for the logical terminal specified by the parameter values.

```
                ____LT 2 IDn 1A1 Control Area - PN 17, HG 26____
Segment mm
     0      2      4      6      8      A      C      E
00   1111   2222   3333   4444   1111   2222   3333   4444
10   0000   1234   1234   1234   1234   1234   1234   1234
20   1234   1234   1234   1234   1234   1234   1234   1234
30   1234   1234   1234   1234   1234   1234   1234   1234
40   1234   1234   1234   1234   1234   1234   1234   1234
50   1111   2222   3333   4444   1111   2222   3333   4444
60   0000   1234   1234   1234   1234   1234   1234   1234
70   1234   1234   1234   1234   1234   1234   1234   1234
80   1234   1234   1234   1234   1234   1234   1234   1234
90   1234   1234   1234   1234   1234   1234   1234   1234
A0   1234   1234   1234   1234   1234   1234   1234   1234
B0   1111   2222   3333   4444   1111   2222   3333   4444
C0   0000   1234   1234   1234   1234   1234   1234   1234
D0   1234   1234   1234   1234   1234   1234   1234   1234
E0   1234   1234   1234   1234   1234   1234   1234   1234
F0   1234   1234   1234   1234   1234   1234   1234   1234

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit      7=Back      8=Fwd            12=Test menu
```

Where:

n	=	blank, non-MLT device
n	=	1—5, change screen sequence of the MLT device for which the data on the panel applies
mm	=	segment number of the current panel.

Note: To analyze the information contained on this panel, see "LT Control Area Bit Definitions" on page 2-191.

Figure 2-75. LT Control Area Panel

Port Control Area Bit Definitions

Bits defined as "Reserved" or may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure.

Table 2-20 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 04	0–1	Reserved
	2	Op Complete pending from device
	3	Selector Pen retry processing
	4	Reserved
	5–6	Reserved
	7	Print ID entry mode
Byte 05	0–6	Reserved
	7	Port timer enabled
Byte 06	0	APL2 Character set supported
	1	Reserved
	2	Any ROS installed
	3	Reserved
	4	APL ROS installed
	5–6	Number of PS Sets 00 = 0 01 = 2 10 = 4 11 = 6
	7	Color device
Byte 07[1]	0	Printer
	1	CUT display
	2	DFT device
	3	MLT device
	4	Reserved
	5	Reserved
	6	Display HAP
	7	Reserved
Byte 08	0	1 = 3278 mode 0 = Native mode
	1	1 = Numeric lock 0 = No numeric lock
	2	1 = Keyboard functions have been redefined 0 = No modifiable keyboard-Keyboard functions have not been redefined
	3–7	Modifications keyboard ID Bit 2–0 Bit 2–1 00000 Reserved Reserved 00001 Typewriter A 00010 Data Entry 1 B 00011 APL C 0100 Reserved D through 11111
Byte 09[1] (Display)	0–3	0000 - Reserved 0001 - APL keyboard/numeric lock 0010 - Text keyboard/numeric lock 0011 - RPQ typewriter keyboard/numeric lock 0100 - Typewriter Attribute Select keyboard/numeric lock 0101 - APL keyboard 0110 - Text keyboard

[1]Actual features identified to the 3174 by the terminal.

Table 2-20 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
		0111 - APL Attribute Select keyboard 1000 - Data Entry 2 keyboard/numeric lock 1001 - Data Entry keyboard/numeric lock 1010 - Typewriter/numeric lock 1011 - Reserved 1100 - Data Entry 2 keyboard 1101 - Data Entry 1 keyboard 1110 - Typewriter 1111 - No keyboard
	4–6	001 - Model 1 010 - Model 2 011 - Model 3 100 - Escape 101 - Reserved 110 - Model 5 111 - Model 4
	7	0 - indicates display byte
Byte 09[1] (Printer	0	ECS feature present
	1	APL feature present
	2	Reserved
	3	Reserved
	4–6	001 - Model 1 010 - Model 2 011 - Model 3 100 - Reserved 101 - Reserved 110 - Model 5 111 - Model 4
	7	1 - Indicates printer byte
Byte 0A[1] (Display)	0	Reserved
	1	Security key
	2	Selector light pen
	3	Reserved
	4	Magnetic slot reader
	5	Reserved
	6	Extended function buffer
	7	ECS adapter
Byte 0B[1]	0–2	Reserved
	3	Color
	4	Display HAP present
	5–7	Reserved
Byte 0F		Port Number 00–1F = TA ports 0–31 20–27 = AEA 1 ports 0–7 28–2F = AEA 2 ports 0–7 30–37 = AEA 3 ports 0–7
Bytes 18–1B.		Device Type in EBCDIC (F0F0F0F0 if not known)
Byte 1C		Additional Information (00 If not known)
	0–3	= E = Programmable device

[1]Actual features identified to the 3174 by the terminal.

Table 2-20 (Page 2 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
		= 1 = Hardware or Microcode product
	4–7	= 1 = IBM Product = 9 = Non-IBM Product
Bytes 1D–1F		Model in EBCDIC (000000if not known)
Bytes 20–21		Plant of Manufacture in EBCDIC (0000 if not known)
Bytes 22–28		Serial number in EBCDIC (00000000000000 if not known)
Bytes 29–2B		Release level in EBCDIC (0000000 if not known)
Bytes 2C–3B		Addition level information (00.....00 if not known)
Byte 3C		2NN
Byte 3D		3NN
Byte 3E		4NN (Program Check Number)
Byte 3F		3NN
	0–2	Reserved
	3	Device powered on
	4–7	Reserved
Byte 50	0	Reserved
	1	VPD support
	2–6	Reserved
	7	0 = Converged keyboard present 1 = Enhanced keyboard present
Byte 5D	0–3	Reserved
	4	Monocase switch active in device
	5	Clicker enabled
	6	CECP Enabled
	7	Device CECP capable
Byte 75	1	Multiple display sessions on display
Byte 77	5	Shared Mode Printer
	6	Local Mode Printer
	6	System Mode Printer
Byte C8	0	ASCII connection for ASCII terminal or ASCII printer available
	1	ASCII host connection valid on this port
	2	AEA port configured as switched
	3–4	Reserved
	5	AEA line trace running

[1]Actual features identified to the 3174 by the terminal.

LT Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bytes 04 and 06 indicate functions supported by the controller and reported as available by the device.

Table 2-21 (Page 1 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 04	0–2	Value Model Buffer Size 000 - Reserved 001 1 960 (480) 010 2 1920(1920) 011 3 2560 (1920) 100 - Reserved 101 - Reserved 110 5 3564 (1920) 111 4 3440 (1920)
	3	0=Display 1=Non-Display
	3–4	11 Printer 01 Data Entry Display 10 None of the others 00 Typewriter Display
	4	0=Escape 1=Printer
	5	SOEMI printer present
	5–7	BREG printer present
Byte 05	0	Katakana keyboard attached
	1	SCS feature installed on printer
	2	Text keyboard
	3	3289 text feature
	4	APL keyboard
	5	Extended keyboard function
	6	Printer supports extended LU1 data stream with SNA FM headers
	7	DFT session
Byte 06	0	Not used
	1	Security keylock present
	2	Selector pen attached
	3	Reserved
	4	MSR/MHS attached
	5	Reserved
	6	3180 in model 6,7,8, or 9 mode
	7	ECS (APL/Text)
Byte 07[1]	0-2	Reserved
	3	Color
	4	Display HAP Supported
	5-7	Reserved
Byte 08	0	Reserved
	1	LT connection active
	2-5	Reserved
	6	Numeric lock field
	7	Reserved
Byte 09	0	Protected field or attribute character
	1–4	Reserved
	5	Keyboard inhibited
	6	Reserved
	7	Insert mode
Byte 0A	0	Reserved

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-21 (Page 1 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	1	Test mode
	2	Alpha shift (not Katakana shift)
	3	Reserved
	4	Text indicator
	5	Upshift indicator
	6	Katakana shift
	7	APL indicator
Byte 0B	0	Online indicator
	1	System wait condition
	2	Hard lock condition
	3	Keyboard in use by operator
	4–7	Reserved
Byte 0D	0	Reserved
	1	Color override
	2	Reserved
	3	Host-initiated local copy request
	4	Alternate screen size
	5	Attributes not valid
	6	Reserved
	7	X.21/X.25 Primary dial terminal
Byte 0E	0–1	Reserved
	2	Print failure indicator
	3	Go elsewhere
	4	Minus function
	5	Wrong card
	6	Message pending
	7	Message reminder
Byte 0F	0	Printer printing – local copy
	1	If display has printer assigned for local copy
	2	Printer matrix changed (associated with this display)
	3–4	Reserved
	5	Communication Check Reminder
	6–7	Reserved
Byte 10	0	Invalid dead key
	1	2NN machine check
	2	Communication check
	3	Application Program check
	4	Security key off
	5	3NN machine check
	6	Too much data entered
	7	Operator not authorized
Byte 11	0	Not enough data entered
	1	Wrong number
	2	Numeric shift
	3	Operator retry

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-21 (Page 2 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	4	Device not functional
	5	Device busy doing local copy
	6	X.21/X.25 operator communication
	7	System lock (X-System)
Byte 12	0	Reserved
	1	My job indicator
	2	System operator indicator
	3	Unowned indicator
	4	Not enabled (not online)
	5	Reserved
	6	Reserved
	7	Minus symbol indicator (WT)
Byte 13	4	PU not active
Bytes 16–17		Cursor position (CUT display only)[2]
Bytes 1A–1B		First character on display[2]
Bytes 1C–1D		Last character on display[2]
Byte 24	0	Model 5 wide screen
	1	Model 5 wide screen
	2	Reserved
	3	Reserved
	4	Inhibit display video
	5	Blank cursor
	6	Cursor reverse
	7	Cursor blink
Byte 25	3	APL mode
	4	APL attached
Byte 26		Row length
Byte 27		Indicator row length (if printer then PCIA length)
Byte 29		AID Code
Byte 33		Printer buffer size 08 = 2K 10 = 4K 20 = 8K
Byte 36	0	Printer allocated to local copy
	1	SNA – local copy printer allocated to host
	2	SNA – host request for local copy allocated printer
	3	Alternate row length
	4	Default row length indicator
	5	Reserved
	6	SNA – LU in ERP state
	7	SNA – Host communication disabled (LU active)
Byte 37	0	Local copy printing (host-initiated)

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-21 (Page 2 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
Byte 3E		4NN (Application Program check number)
Byte 3F		4NN (Communication check number)
Byte 4A	0	Reserved
	1	Selector pen for immediate defect field
	2	Request for select pen field
	3	Reserved
	4	Reserved
	5	Reserved
	6	Reserved
	7	Reserved
Byte 4B	0	Disable cursor display
	1	Reserved
	2	Second local copy requested
	3	Local copy busy
	4	Reserved
	5	Dead key sequence in progress
	6	Local copy received IR
	7	Reserved
Byte 4C	0	Device attached to CU VIA AEA adapter
Byte 52	0–7	Attribute affecting field cursor[3]
Byte 53	0–7	Current extended field attribute
Bytes 54–55		Present attribute address[2]
Bytes 56–57		Next attribute address[2]
Byte 68	0	Printer equipment check/display disabled error
	1	Intervention required
	2	Printer busy processor abort
	3	Reserved
	4	Print in process
	5	Start printing pending
	6	Printer disabled
	7	Reserved
Byte 6A	0	Shift/numeric lock key still depressed
	1	Alpha key pressed
	2	Alternate shift key pressed
	3	Shift/numeric lock key in effect
	4	Left shift key
	5	Right shift key
	6	Katakana shift key was pressed
	7	APL key select APL mode
Byte 6B	0	Reserved
	1	Local copy being printed
	2	Reserved
	3	Reserved

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-21 (Page 3 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	4	Reserved
	5	Reserved
	6–7	Reserved
Byte 70		Local copy printer ID
Byte 71		Local copy printer address
Bytes 72–73		Printer DCB devices 0 – 15, ones in this field are authorized to use this printer
Bytes 74–75		Printer DCB devices 16 – 31 (same as Bytes 72, 73 description)
Bytes 76–77		Printer class assignments (printer only) 1 in one or more bits (0–15) represents printer class assignments 70–85
Byte A0		WCC save area
Byte AE	0	Reserved
	1	Device is bound
	2	Start data traffic (DFT - pending bind response)
	3	Outbound pacing ind (DFT - pending unbind response)
	4–6	Half-duplex FSM 000 = Send state 001 = Pending send 010 = Pending receive 101 = Contention 111 = Receive
	7	Error pending (response sent)
Byte AF	0–3	Bracket state mach 0000 = Between brackets 1111 = In brackets 0001 = Pending in brackets 0010 = Pending begin bracket 0011 = Pending between bracket-EC received 0100 = Pending between bracket-EC sent 0101 = Pending between bracket-response received 0110 = Pending between bracket-response sent 0111 = Pending between bracket-purge received 1000 = Pending between bracket-receive 1001 = Pending between bracket-purge sent
	4	0 = Send between chain 1 = Send in chain

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Table 2-21 (Page 3 of 3). LT Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
	5–6	Chain receive 00 = Receive between chain 01 = Receive in chain 11 = Receive purging chain
	7	Crypto inbound padding indicate
Byte B0	5	End chain receive
	6	0 = Outbound segmenting between BIU 1 = Outbound segmenting in BIU
Byte B1	4	0 = Not last buffer in this RU 1 = Last buffer in this RU
	5	First buffer in RU
Byte B5	0–7	LU type bound (01,02,03)
Byte B6	0–7	Printer outbound pacing count
Bytes DC–DD		Default screen size
Bytes DE–DF		Alternate screen size
Byte F3	0	LT trace enabled
	2	DFT LTs are mapped
Byte F7	2	Greek E–Tech keyboard attached

[1]Features supported and reported as available by the device associated with the LT Control Area.
[2]When using this byte, subtract hex 50. This will give you presentation space address origin 0.
[3]See *3174 Reference Summary*, GX27-3872, for attribute description.

Test 6, Option 3

Type **3** to select option 3 from the Display Control Blocks Menu. Figure 2-76 shows the information for X.21 short-hold mode.

```
                    ____X.21 /X.25 SHM Host Control Data____

      0     2     4     6     8     A     C     E
      0000  0000  0000  0000  0000  0000  0000  0000
00    uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu
10    uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu
20    uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu
30    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
40    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
50    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
60    xxxx
70
80
90
A0
B0
C0
D0
E0
F0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                    12=Test menu
```

Figure 2-76. X.21 Short-Hold Mode Host Control Data

Where:

uuuu = XID sent by the 3174 (comes from configured data)
xxxx = XID received by the 3174 on a reconnection

The configured XID (the one sent to the host at start time) and the last reconnect XID (the last one sent to the host during an SHM session) are displayed. If, for example, a normal X.21 host connection should be established following an SHM connection, the XID displayed by /6,3 would be for the last SHM connection. Bit 6 (SHSI) in the XID sent indicates short hold mode is active: it is not sent on with the initial XID; it is sent during a reconnection. This bit is turned on after an SNRM (Set Normal Response Mode) has been received. Table 2-22 on page 2-256 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-76.

Table 2-22. X.21 XID Summary

Location	Bit	Meaning
Byte 0[1]		Format of XID I-field and PU type of
	0–3	Format of XID I-field. 0 = fixed format; bytes 0–5 used 1 = variable format; bytes 0–P are used
	4–7	PU type of the sender 1 = PU-T1 2 = PU-T2 3 = Reserved 4 = PU-T4 5 = PU-T5
Byte 1		Length in hexadecimal of the variable format XID I-field. This byte is reserved in a fixed format XID.
Bytes 2–7[2]		Node identification
Bytes 2-5	0–11	The product block number.
	12-31	The SDLC ID.
Bytes 6,7		Reserved
Byte 8		Link-station and connection protocol flags
	0–1	Reserved
	2	Link station role of XID sender 0 = Sender is a secondary link station 1 = Sender is a primary link station
	3	Reserved
	4–7	Link station transmit/receive capability 0 = two way alternating 1 = two way at the same time
Byte 9		Node characteristic of the XID sender
	0	PU capability to receive FMD requests 0 = PU cannot receive FMD requests from the SSCP 1 = PU can receive FMD requests from SSCP
	1	Reserved
	2–3	Segment assembly capability of the nodes PC element 00 = The mapping field is ignored and PUIs are forwarded unchanged 01 = Segments are assembled on a link station basis 10 = Segments are assembled on a session basis 11 = Only whole BIUs are allowed
	4–5	Reserved
	6[3]	Short hold status indicator (SHSI) 0 = Not already engaged in a SHM session 1 = Engaged in a SHM session
	7	Short hold indicator (SHI) 0 = Short-hold mode not supported 1 = Short-hold mode supported
Byte 10		Maximum I field length the XID sender receives
	0	Format flag (always 0)
	1–15	Maximum I (field length)
Byte 12	0–3	Reserved
	4–7	SCLC command/response profile 0 = SNA link profile (only value)
Byte 13	0–1	Reserved
	2	SDLC initialization mode options 0 = SIM and RIM not supported 1 = SIM and RIM supported
	3–7	Reserved
Byte 14–15		Reserved
Byte 16	0	Reserved
	1–7	Maximum number of I frames that can be received by the XID sender before an ACK is sent
Byte 17		Reserved
Byte18		Length in bytes of the SDLC address to be assigned. Byte 18 is not used by the 3174. (Byte 18 = 00).
Byte 19		The length of the dial digits in hexadecimal of the XID sender.
Byte 20		The starting byte of the XID sender dial digits.

[1]Byte 0 = 12 for 3174 variable format XIDs
[2]Bytes 2–7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved
[3]Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Table 2-22. X.21 XID Summary

[1]Byte 0 = 12 for 3174 variable format XIDs
[2]Bytes 2–7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved
[3]Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Type **3** to select option 3 from the Display Control Blocks Menu. The following panel shows the information for X.25.

```
                    ____X.21/X.25 Host Control Data_____

      0    2    4    6    8    A    CE

      0000 0000 0000 0000 0000 0000 0000 0000
00    iiii iiii iiii iiii iiii iiii iiii iiii
10    iiii iiii iiii iiii iiii iiii iiii iiii
20    iiii iiii xaxb xxxx xxxx xxxx xxxx xxxx
30    xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx
40    xxxx xxxx xxxx rrrr xxxx xxxx rrrr rrrr
50    zzzz zzzz zzzz zzzz rrrr zzzz zzzz zzzz
60    rrrr
70
80
90
A0
B0
C0
D0
E0
F0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _
PF: 3=Quit                                  12=Test menu
```

Where:

iiii = Reserved
xxxx = 2-byte link counter
xaxb = 2-byte link counter used in the example below
zzzz = 2-byte circuit counter
rrrr = Reserved

Figure 2-77. X.25 Host Control Data

Use the following example to determine how to locate a particular byte and the information following the example for descriptions of the link and circuit counters. The bytes are described in Table 2-22 on page 2-256, "Link Counters" on page 2-258, and "Circuit Counters" on page 2-258.

Example

To locate bytes 24 and 25:

1. Use the high-order digit 2. Scan down the column of numbers in the left margin of the panel. Find address 20.
2. Use the low-order digit 4. Scan left to right in the row of data next to address 20. Find the data under column number 4. Byte 24 contains xa; byte 25 contains xb.

Link Counters

Bytes 24, 25 = The number of Information (I) frames sent by the 3174.

Bytes 26, 27 = The number of Information (I) frames received by the 3174.

Bytes 28, 29 = The number of Receiver Ready (RR) frames sent by the 3174.

Bytes 2A, 2B = The number of Receiver Ready (RR) frames received by the 3174.

Bytes 2C, 2D = The number of Receiver Not Ready (RNR) frames sent by the 3174.

Bytes 2E, 2F = The number of Receiver Not Ready (RNR) frames received by the 3174.

Bytes 30, 31 = The number of Reject frames sent by the 3174.

Bytes 32, 33 = The number of Reject frames received by the 3174.

Bytes 34, 35 = The number of I-frames that were retransmitted by the 3174.

Bytes 36, 37 = The number of I-frames that were received by the 3174 with Frame Check Sequence (FCS) errors.

Bytes 38, 39 = The number of receive errors detected by the 3174.

Bytes 3A, 3B = The number of cycle steal underruns detected by the3174. This is an internal-exception condition and is retried by the 3174.

Bytes 3C, 3D = The number of receive buffer overruns detected by the3174. This is an internal-exception condition and is retried by the 3174.

Bytes 3E, 3F = The number of receive control block overruns detected by the 3174. This is an internal-exception condition and is retried by the 3174.

Bytes 40, 41 = The number of aborts detected by the 3174.

Bytes 42, 43 = The number of CS overruns detected by the 3174. This is an internal-exception condition and is retried by the 3174.

Bytes 44, 45 = A valid frame has not been received within the time limit specified during configuration.

Bytes 48, 49 = The number of call attempts counted by the 3174.

Circuit Counters

Bytes 50, 51 = The number of Data packets sent by the 3174.

Bytes 52, 53 = The number of Data packets received by the 3174.

Bytes 54, 55 = The number of Receiver Ready packets sent by the 3174.

Bytes 56, 57 = The number of Receiver Ready packets received by the 3174.

Bytes 5A, 5B = The number of Receiver Not Ready packets sent by the 3174.

Bytes 5C, 5D = The number of Interrupt packets sent by the 3174.

Bytes 5E, 5F = The number of Interrupt packets received by the 3174.

Test 7 Configuration B: Color Convergence

This test is only available on 1TEST. Test 7 performs color convergence on 3279 color display stations. For a description of this procedure, see the appropriate display station problem determination manual.

Note: No PF keys are provided for this test to return to the Test Menu. To bring up the Test Menu after performing the test, press the CLEAR key.

Test 8 Configuration B: Extended Functions and Programmed Symbols

Test 8 checks the programmed symbols (PS) and color for any device that uses PS or color. For a description of this procedure, see the appropriate display station problem determination manual.

Test 9 Configuration B: Display the Token-Ring Test Menu

This test is only available on 1TEST. Test 9 provides a test facility to check the status of the Token-Ring, the Token-Ring adapter, and attached links. To select one of the test options from the Token-Ring Test Menu, perform the following at any 3278 or similar display station.

Note: Test 9,1 can only be performed from one terminal at a time.

1. Press and hold ALT; press TEST
2. Type in **/9**
3. Press ENTER; the Token-Ring Test Menu is displayed.
4. Type in a test option number and press ENTER.

```
                    _____ Token-Ring Test Menu _____

Option          Description

1               Monitor Token-Ring status
2               Display Token-Ring adapter status summary
3               Reset Token-Ring adapter status counters
4               Display link status summary for all links
5,n             Display link status summary for link address n
6               Reset link status counters for all links
7,n             Reset link status counters for link address n
8               Display Gateway host status summary




To go directly to other tests, enter: /Test,Option
Select Option;  press ENTER ===> _

PF: 3=Quit                  12=Test menu
```

Figure 2-78. Token-Ring Test Menu

Option 1. Monitor Token-Ring Status. See Figure 2-79 on page 2-261.

Option 2. Display Token-Ring status summary. See Figure 2-80 on page 2-262

Option 3. Reset the Token-Ring adapter status counters.

Option 4. Display link status for all links. See Figure 2-81 on page 2-264 for all links.

Option 5. Display the link status counters for the 6 links starting with the link selected in the test request. A 7-byte link address is required for this test. The address is a 6-byte Token-Ring adapter address followed by the 1-byte link station service access point (SAP) address.

Option 6. Reset link status counters for all links.

Option 7. Reset the link status counters for the link selected in the test request.

Option 8. The number of customized links and host address ranges. For each customized link, it will display the host address, the host link status, and the Token-Ring address. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to

see the original values.) See Figure 2-82 on page 2-268 for an example of the Gateway Host Status Summary panel.

Note: Option 8 is only available on those controllers with the Gateway feature. The feature is available on Models 1L, 1R, 2R, 11R, 11L, 12R, 51R, 61R, and 62R.

Test 9, Option 1

The following panel is displayed.

```
                    _____ Token-Ring Status _____

4697 - Local Token-Ring Adapter closed

4691 - Signal Loss (Adapter not detecting ring signal)

4692 - Hard Error (Adapter detecting a beacon condition)
       either internally or receiving a Beacon MAC frame)

4693 - Wire Fault (Adapter has detected a wire fault
       and de-inserts)

4694 - The test has been active for 00000 minutes.

4695 - The test will terminate in n minute(s)
       Press PF9 to continue for another 10 minutes.

To go directly to other tests, enter: /Test,Option
Select Test; press ENTER ===> _

PF: 3=Quit                  9=Cont              12=Test menu
```

Figure 2-79. Token-Ring Status (Example showing messages that could occur)

4697 - Indicates that the Token-Ring adapter is closed.
4691 - Appears when the Token-Ring adapter detects a signal loss condition on the ring.
4692 - Appears when the Token-Ring adapter detects a beaconing condition.
4693 - Appears when the Token-Ring adapter detects a wire fault (open or short) condition on its own lobe.
4694 - Indicates the amount of time that has elapsed from the start of the ring status test.
4695 - Appears when the test has been running for 10 minutes. The test runs for another 5 minutes and terminates automatically, unless PF9 is pressed. If PF9 is pressed within the 5-minute time frame, the test runs 10 or more minutes and 4695 is displayed again.
4698 - Appears when the Token-Ring adapter is open.

Test 9, Option 2

The following panel is displayed.

```
              ____Token-Ring Adapter Status Summary____

Adapter Address -   XXXXXXXXXXXXX    Adapter Status -   Open

Customized Links -  XXX              Active Links -     XXX

                       Counters        Overflow

Line Errors            XXXXXXXX           0
Internal Errors        XXXXXXXX           0
Burst Errors           XXXXXXXX           0
ARI/FCI Errors         XXXXXXXX           0
Abort Delimiters       XXXXXXXX           0
Lost Frames            XXXXXXXX           0
Receive Congestion     XXXXXXXX           0
Frame Copied Errors    XXXXXXXX           0
Frequency Errors       XXXXXXXX           0
Token Errors           XXXXXXXX           0

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit                                        12=Test menu
```

Figure 2-80. Token-Ring Adapter Status Summary

- **Adapter Address** - This is the 6-byte Token-Ring address of the Token-Ring adapter set up when the controller was configured, followed by a 1-byte service access point address (SAP).
- **Adapter Status** - This shows the Token-Ring adapter's physical state relative to the Token-Ring (opened or closed).
- **Customized Links** - The number of links identified during configuration of the Control diskette. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.)
- **Active Links** - The number of the links active at the time the test request was entered.

Line errors - This counter is increased when a frame is copied or repeated by the protocol handler, the error detect indicator is zero, and one of the following conditions exists:

- A code violation exists between the starting delimiter and the ending delimiter of a frame.
- A code violation in a free token.
- A frame check sequence error is a format type 1 frame.

Internal errors - This counter is increased when the controller recognizes an internal Token-Ring adapter error. These errors indicate the Token-Ring adapter is in a marginal operating condition.

Burst errors - This counter shows the number of burst interrupts from the protocol handler. The burst error counter indicates the number of frames that are in error due to noise on the ring.

Address Recognized Indicator/Frame Copied Indicator (ARI/FCI) - This counter is increased when the Token-Ring adapter receives a frame back that has the address recognized and/or the frame copied bit not set. This error is due to the receiving station having no buffers available, or a wrong address received (line hit), or the ARI/FCI bits could not be set.

Abort Delimiters - This counter is increased when the Token-Ring adapter transmits an abort delimiter. This occurs with internal Token-Ring adapter errors.

Lost Frames - This counter is increased when the Token-Ring adapter is in transmit mode and fails to receive the frame it transmitted.

Receive Congestion - This counter is increased when the Token-Ring adapter is busy and recognizes a frame addressed to it, but cannot receive the frame because of insufficient buffer space.

Frame Copied Errors - This counter is incremented when the Token-Ring adapter sees a frame with its own address and the ARI or FCI bit is set on. This indicates that another device or controller may be attached to the ring that has a duplicate address.

Frequency Errors - This counter is increased when the Token-Ring adapter detects an excessive difference between the ring data frequency and the Token-Ring adapter's frequency oscillator.

Token Errors - This counter is increased when the active monitor function detects an error with the token protocol. These errors indicate another device or controller is not following normal token protocols.

Test 9, Option 4

The following panel is displayed.

```
                    _____ Link Status Summary _____

Link Address        XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX
Primary/Secondary         XX/XX             XX/XX             XX/XX
Trans I-Frames       XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Rec I-Frames         XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Transmit Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Received Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
T1 Expired           XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Com/Res Ind               XX YY             XX YY             XX YY

Link Address        XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX  XXXXXXXXXXXXXXXX

Primary/Secondary         XX/XX             XX/XX             XX/XX
Trans I-Frames       XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Rec I-Frames         XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Transmit Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Received Errors      XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
T1 Expired           XXXXXXXX  - 0     XXXXXXXX  - 0     XXXXXXXX  - 0
Com/Res Ind               XX YY             XX YY             XX YY

To go directly to other tests, enter: /Test,Option
Select Test;  press ENTER ===> _

PF: 3=Quit      7=Back    8=FWD                 12=Test menu
```

Figure 2-81. Link Status Summary

The link status summary screen shows the link address, the data link control (DLC) primary and secondary states, the command/response indicator, and the logical link station counters.

Link Address - This is the station address assigned to each link during configuration. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Trans I-Frames - This counter shows the number of Information format LPDUs that have been sent, including all retransmissions. The actual counter for the link is reset when there is an overflow of any counter, or whenever the link is initialized.

Rec I-Frames - This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors - This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Receive Errors - This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired - This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

Com/Res Ind - XX indicates the last command/response received. ZZ indicates the last command/response sent.

Primary/Secondary - These are the SDLC primary and secondary states for the link station,

Where:

Primary State		Secondary State	
80	Link Closed	80	Checkpointing
40	Disconnected	40	Local busy (operator)
20	Disconnecting	40	Local Busy (buffer)
10	Link Opening	10	Remote Busy
08	Resetting	08	Rejection
04	Frame Reject Sent	04	Clearing Algorithm Running
02	Frame Reject Received	02	Dynamic Window
01	Link Opened	01	Reserved

Note: The primary states are mutually exclusive. The secondary states are not mutually exclusive.

Primary States

The following paragraphs describe the Token-Ring adapter link primary states.

Link Closed

The link closed state is entered in the following cases:

- A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission will complete when the transmission completes.
- A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.
- A Reset command has been received, but a transmission has already been queued to the hardware, or an ARB request or SSB response has been queued to the controller and must complete before the link station control block can be released.

No commands are accepted while the Token-Ring adapter is in the link closed state. All received frames are ignored.

Disconnected

The disconnected state is entered in the following cases:

- Acceptance of an Open Station SRB
- Acceptance of a SABME for a previously nonexistent station
- Receipt of a DISC command or a DM response from the paired station
- When the retry count has been exhausted due to time-outs.

In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

The following SRBs are accepted:

Close station SRB - Transition to link closed.
Connect station SRB - Transition to link opening.

Disconnecting

The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state may also be entered on expiration of the retry count in FRMR received. This state is maintained until one of the following occurs:

- Either a UA or DM response is received to the transmitted DISC command.
- A SABME command is received and a DM response has been transmitted.
- The retry count expires.

There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting is to disconnected. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The Token-Ring adapter exits this state to the link is nonexistent or the link is closed. Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

Link Opening

The Token-Ring adapter enters the link opening state when the controller accepts a Connect station SRB.

Resetting

The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The Token-Ring adapter reports receipt of the SABME command to the controller using a DLC Status ARB indicating a SABME command was received and the Station ID of the affected station. In this state, the Token-Ring adapter accepts the following SRBs:

Close Station SRB - Transition to the disconnecting state.
Connect Station SRB - Transition to the link opening state.

All incoming frames are ignored except the following:

DISC - Transmit UA, transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to FRMR received.
SABME - The Token-Ring adapter informs the controller.

Frame Reject Sent

When the Token-Ring adapter transmits a Frame Reject (FRMR) because of the receipt of an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

All incoming frames except the following are ignored except that FRMR response final will be transmitted in response to command polls:

SABME - Transition to the resetting state.
DISC - Transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to the FRMR received state.

Frame Reject Received

When the Token-Ring adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The Token-Ring adapter then enters the FRMR received state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

In this state, all frames except the following are ignored:

SABME - Transition to the resetting state
DISC - Transition to the disconnected state
DM - Transition to the disconnected state.

Link Opened

The link opened state is entered from link opening after the SABME-UA exchange which completes the connection protocol. This is the only state in which information transfer is allowed and in which transmit SRBs are accepted. In this state, the Token-Ring adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

If the primary state is changed from link opened because of receipt of a frame such as SABME or FRMR, or because the retry count has been exhausted, any outstanding Transmit requests are returned to the controller by using a single Transmit SSB. If the primary state is changed because of a user command such as Close station, outstanding Transmit requests are not returned.

Secondary States

The following paragraphs describe the Token-Ring adapter link secondary states.

Checkpointing

A poll is outstanding. I-frame transmission is suspended.

Local Busy (User)

A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.

Local Busy (buffer)

An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.

Remote Busy

An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.

Rejection

An out of sequence I-frame has been received and a REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.

Clearing

A poll is outstanding and a confirmation of clearing Local Busy is required after the response is received.

Dynamic Window

A remote station on another ring is connected through a bridge to the local ring and there appears to be congestion through the bridge(s).

Test 9, Option 8

The following panel is displayed.

```
                    _____ Gateway Host Status Summary _____

Customized Links -       XXX            Address Range -          XX-XX

Host      Link       Token-Ring        Host      Link       Token-Ring
Address   Status     Address           Address   Status     Address
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX
XX          XX       XXXXXXXXXXXXX     XX          XX       XXXXXXXXXXXXX

To go directly to other tests, enter: /Test,Option
Select ===>

PF:  3=Quit      7=BACK        8=FWD              12=Test menu
```

Figure 2-82. Gateway Host Status Summary

The Gateway Host Status Summary panel shows information on the links and addresses, and the status of the links.

Customized Links - The number of links declared at customizing time if storage was available to support them or the maximum number of links possible in the storage available (this field reflects the downgraded configuration). This field reflects one link for the local PU.

Address Range - The host address range declared in customizing. This field reflects the downgraded condition.

Host Address - The address assigned each link during customizing

Link Status - The 2-digit status code representing the status of the link:

For Model 1L and 11L:

00 = The Token-Ring attached physical unit is in disconnect mode
02 = The Token-Ring attached physical unit is connected.

For Models 1R, 2R, 11R, 12R 51R, 52R, 61R, and 62R:

00 = SNRM required
01 = SNRM received
02 = Connected/active
03 = Poll timeout.

Token-Ring Address - The station address assigned to each link during customizing. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Test 10 Configuration B: Port Wrap Tests

This test is only available on 1TEST. Test 10 runs a wrap test on ports on the terminal adapter, the TMA card, the 3299 Models 2 and 3, and the 7232 dual control unit terminal multiplexer. Test 10 will not run on a 3299 Model 1. If a terminal is in use on one of the ports selected for a wrap test, this test will not interrupt the operation of that terminal. The wrap test will not be performed, and the test will indicate that the selected port is in use. This test cannot be run on the requesting terminal. The results of the port wrap test will be indicated by a text message on line 23. The menu displayed is shown in Figure 2-83. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/10**
3. Press ENTER.

```
                    ____Port Wrap Test____

Option        Description

1,n           Direct wrap for terminal adapter port n
2,n           3299/terminal multiplexer wrap for port n (n=0-31)

              To insure a valid wrap the cable must be
              disconnected from the wrapped port.









To go directly to other tests, enter: /Test,Option
Select Option;  press ENTER ===> _

PF: 3=Quit                          12=Test menu
```

Figure 2-83. Port Wrap — Test 10

When using Test 10, disconnect the signal cable from the port that is being wrapped. Reflections from the signal cable can cause the test to fail, giving a false error indication. If failures occur, see the *3174 3174 Status Codes*, GA27-3832, for recovery action.

Option 1 (Direct Wrap)

- For Models 1L through 13R, valid terminal adapter port numbers are 0, 8, 16, and 24.
- For Models 51R through 63R, valid terminal adapter port numbers are 0 through 8.
- For Models 81R through 92R, the valid port number is 0 through 3.

Option 2 (Multiplexer Wrap)

- For Models 1L through 13R, valid port numbers are 0 through 31.
- For Models 51R through 6R, valid port numbers are 0 through 15.
- For Models 81R through 92R, valid port numbers are 0 through 7.

Test 11 Configuration B: Trace Control

This test is to be used by service representatives. The service representative must obtain a password from an IBM support facility to perform this test.

Trace Control is an internal subsystem facility that is used to record specific subsystem processing information. The information that is traced is saved in machine storage and can be written to the Control diskette as required. Two types of information can be recorded by the trace facility:

- Data between processes
- Internal data flow.

Environment control block (ECB) traces record information between processes. When ECBs are traced, the appropriate ECB numbers are entered as part of the trace test request.

Function traces record information within a process. For example, internal data flow for the file adapter is recorded.

The trace facility is performed in two environments:

- Background
- Foreground.

Background trace is integrated into the controller microcode and is started as a part of the controller normal IML sequence. Background trace must be stopped before a foreground trace can be started.

Foreground trace is started by selecting a Test 11 option and specifying ECB(s) tracing or Internal Data Flow tracing. Test 11 provides a means of starting, stopping, or modifying a particular trace. When the trace facility is started, with a Start Trace command, a foreground trace starts. When the trace facility is stopped with a Stop Trace command, all traces are stopped. When a foreground trace is no longer required, the foreground trace must be stopped and the background trace must be restarted, either by use of the Test 11 trace facility or by a normal IML.

Trace Control Mode

There are four trace control modes. Mode 02 is the default mode if another mode is not selected when setting up a trace.

Mode 01 Do not write to the diskette or fixed disk and do not wrap the trace data area in controller storage.
Mode 02 Do not write to the diskette or fixed disk and wrap the trace data area in controller storage.
Mode 03 Write to diskette or fixed disk without suspend.
Mode 04 Write to diskette or fixed disk with suspend.

How to Use the Trace Facility

Before you attempt to start or stop a trace, the following information must be obtained from the 3174 support center:

- Check digit
- Trace mode (optional)
- Setup ECB number(s) or Setup Trace Function number(s).

Trace Facility Options

- 11,1,Check digit,n,n,n,n.....n Set Up ECB(s) Dispatched
- 11,2,Check digit,n,n,n,n.....n Set Up ECB(s) Returned
- 11,3,Check digit,n,n,n,n.....n Set Up DCB(s) Ports
- 11,4,Check digit,n,n,n,n.....n Set Up Trace Functions
- 11,5,Check digit,nn Set Up Trace Mode
- 11,6,Password Start Trace
- 11,7,Password Stop Trace

11,1 Option The specified ECBs are traced when dispatched. Format = 11,1,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,2 Option The specified ECBs are traced when returned.
Format = 11,2,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,3 Option The specified ports are traced.
Format = 11,3,Check digit,n,n,n,n.....n where n,n,n,n.....n are port numbers. The check digit number and the port number(s) are obtained from the 3174 support center.

11,4 Option The specified functions are traced.
Format = 11,4,Check digit,n,n,n,n.....n where n,n,n,n.....n are trace function numbers. The check digit number and the trace function number(s) are obtained from the 3174 support center.

11,5 Option The trace runs in the specified mode.
Format = 11,5,nn where nn are mode numbers 01 through 04. The check digit number and the mode number are obtained from the 3174 support center.

11,6 Option The trace is started.
Format = 11,6,password
The password is obtained from the 3174 support center.

11,7 Option The trace is stopped.
Format = 11,7,password
The password is obtained from the 3174 support center.

How to Start a Foreground Trace

When Concurrent Communication Adapters are present, verify that xTEST in the operator information is correct for this trace.

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press TEST to enter test mode.
2. Type in **11,7,Password** (Stop Trace)
3. Type in **11,5,check digit,nn** (Set Up Trace Mode) (This step is optional.)
4. Type in one of the following to set up the desired trace:
   11,1,check digit,n,n,n,n.....,n
   11,2,check digit,n,n,n,n.....,n
   11,3,check digit,n,n,n,n.....,n
   11,4,check digit,n,n,n,n.....,n
5. Type in **11,6,password** (Start Trace)
6. Type in **11,7,password** (Stop Trace)

Note: The password is obtained from the 3174 support center.

How to Start a Background Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press Test to enter test mode.
2. Type in **11,7,Password**
3. Type in **11,6,Password**

Note: The password is obtained from the 3174 support center.

Test 12 Configuration B: Asynchronous Emulation Adapter Tests

This test is only available on 1TEST. Test 12 provides a test facility for terminals, ports, and smart-modems attached to an Asynchronous Emulation Adapter (AEA). It also provides a status summary for all ports of the three Asynchronous Emulation Adapter hardware groups (HGs), and allows line errors to be reset for an individual Asynchronous Emulation Adapter port or for all ports of a specific Asynchronous Emulation Adapter HG. When Test 12 is selected, the menu shown in Figure 2-84 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/12**
3. Press ENTER; the Asynchronous Emulation Adapter Test Menu is displayed.

```
                _____ Asynchronous Emulation Adapter Tests _____

Option    Description

  1       AEA port tests menu
  2       Display status summary
  3       Reset line errors on all AEA HGs
  3,n     Reset line errors on HG n (n=21-23)
  4,m,n   Display error counters for
          port m on HG n (m=0-7, n=21-23)
  5,m,n   Display connectivity for port m HG n (m=-7, n=21-23)


Note:
   - Option 1 exits from 3174 TEST mode

To go directly to other tests, enter: /Test,option
Select option;  press ENTER ===> _

PF:  3=Quit                                  12=Test menu
```

Figure 2-84. Test 12 Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter menu to display the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-85 on page 2-275 for an example of the test menu.

Option 2. Select option 2 on the Asynchronous Emulation Adapter menu to display the status summary for the ASCII terminals on all three ASCII HGs. See Figure 2-86 on page 2-277 for an example of the status summary panel.

Option 3. Select option 3 on the Asynchronous Emulation Adapter menu to reset the line errors on all the ASCII HGs installed.

Option 3,n. Select option 3 to reset the line errors for the specific HG n.

Option 4,m,n. Select option 4 to display error counters for a specific port.

Option 5,m,n. Select option 5 on the Asynchronous Emulation Adapter menu to display connectivity for a specific port.

Test 12, Option 1

This test option shows the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-85 on page 2-275 for an example of the test menu.

```
                 _____Asynchronous Emulation Adapter Port Tests_____

Option     Description

  1,PN,HG          Connect to smart-modem
  2,PN,HG          AEA port wrap
  3,PN,HG          Transmit data (default settings)
  3,PN,HG,WXYYZZ   Transmit data (override settings)

PN=Port Number (0-7)    HG=Hardware Group (21-23)
WXYYZZ=Override port and station descriptor values

NOTES:
    - Use MENU REQUEST key sequence to return to this menu
      when above options are selected
    - Option 2 requires a wrap plug on requested port
    - Use TEST REQUEST key sequence to return to 3174 TEST mode

Select option;  press ENTER ===> _

PF:  3=Quit                                    12=Disconnect
```

Figure 2-85. Asynchronous Emulation Adapter Port Tests Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter Port Tests Menu to access and test a smart-modem through its Asynchronous Emulation Adapter port, provided that port is not presently in session. Access and manipulation of the modem, using that modem's command syntax, enables the following:

- Modem Customizing and Test

  This function provides access to internal diagnostic and customizing procedures built into certain smart-modems. There are two reasons why this function is important:

  1. By running diagnostics internal to the modem, you will be able to isolate a problem in the asynchronous communication equipment on a specific port, provided proper operation of the Asynchronous Emulation Adapter port has already been verified.
  2. By customizing the modem to certain specifications, you can ensure proper operation or verify whether or not the modem had been customized correctly for normal operation.

- Modem Dial-out Function

  This function enables you to test the dial-out capability of the modem. By providing a number to the modem of a phone nearby or of an actual ASCII dial-in port, you can verify proper operation of the modem.

Option 2. Select option 2 on the Asynchronous Emulation Adapter Port Tests Menu to access to an Asynchronous Emulation Adapter port not presently in session. This access allows you to perform a wrap test on the Asynchronous Emulation Adapter port.

Note: The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) must be installed on the port connector before invoking the wrap test.

If a modem cable is attached to the port being tested, by installing a wrap plug at the modem end of that cable you can also test the cable.

Option 3. Select option 3 on the Asynchronous Emulation Adapter Port Tests Menu to verify an ASCII terminal's ability to transmit and receive data correctly. From the invoking terminal, you can send data through the Asynchronous Emulation Adapter port connector to a terminal not presently in session. This test will verify the data path and the operation of the terminal receiving the data.

Example of Option 3,PN,HG Test:

1. At any ASCII terminal, terminate the customer application or session (if active) and return to the Connection Menu.
2. For most ASCII terminals, hold down Esc and press T to enter test mode. (For those terminals that do not accept Esc and T for test mode, see the *3174 Terminal User's Reference*, GA23-0332.)
3. At the 3174 Test Menu, select Option 12 (Asynchronous Emulation Adapter Tests).
4. At the Asynchronous Emulation Adapter Test Menu, select Option 1 (AEA Port Tests Menu).
5. At the AEA Port Tests Menu, type in **3,PN,HG** where:

   PN = Port Number (0−7) of the device being tested
   HG = Hardware Group (21, 22, or 23) of the device being tested.

6. Press carriage return.
7. The controller responds with a READY message.
8. Perform steps a and b **only** if the device being tested is attached to a switched port with a smart-modem. If the port is nonswitched, go to step 9.
   a. Type in **ATD9,,XXX-XXXX** where:
      ATD (uppercase characters) must be keyed in while holding the shift key.
      9 is the access code (optional), and ,, is two 2-second pauses.
      XXX-XXXX is the phone number of the smart-modem attached to the device being tested.
   b. Press carriage return. The controller responds with a CONNECT message.
9. Type in a test message or any string of characters.
   The message or characters will not appear on your terminal.
10. Press carriage return. The data will appear on the device being tested.
11. A test message can then be entered at the device being tested and sent back to the invoking terminal by keying in the test message and pressing carriage return.
12. To return to the Asynchronous Emulation Adapter Tests menu, press ESC, hold down CTRL, and press H.

The override settings, indicated by WXYYZZ on the test menu, are parameters used by the controller to communicate with ASCII devices. These parameters are entered during customizing and this test allows you to temporarily change them without changing the actual customizing.

Note: If you enter override settings, you may also need to change the parameters on the ASCII device(s) you are testing.

The following table shows the values for WXYYZZ:

Table 2-23. WXYYZZ Override Settings

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Mark	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Space	20 = DTR	
3 = 1200 bps	3 = Even	80 = XON/XOFF	
4 = 2400 bps	4 = Odd		
5 = 4800 bps	7 = None		
6 = 9600 bps			
7 = 19 200 bps			

Test 12, Option 2

Figure 2-86 shows the status of the Asynchronous Emulation Adapter(s) and all devices attached to it.

```
                        _____Status Summary_____

Port              HG 21              HG 22              HG 23

Address       0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7

Attach        d s d d l   s l
Status        1 1 1 0 1 x 0 -    (Disabled)         (Not present)
Station       v v v p h   ? h
Line          . . : . .     *
Host/term     3 A 3   3
LU            +   +

  d = direct        1 = on            v = video display     . = 0 errors
  l = nonswitched   0 = off           p = printer           : = 1-50
  s = switched      - = disabled      h = host              | = 51-100
  3 = 3270          x = unconfigured  ? = unknown           * => 100
  A= ASCII          + = in session

To go directly to other tests, enter: /Test,Option
Select test;  press ENTER ===> _

PF:  3=Quit                                    12=Test Menu
```

Figure 2-86. Test 12 Status Summary Panel

Port Address: Indicates the terminal port number (0—7) for HG 21, 22, and 23.

Attach: Indicates how the terminal is attached to the Asynchronous Emulation Adapter port.

blank = No attachment type (port unconfigured)
d = Direct attachment
s = Switched attachment
l = nonswitched attached

Status: Indicates the state of the terminal at the time the status summary was requested.

Disabled = This Asynchronous Emulation Adapter is in the disabled state.
Not present =This Asynchronous Emulation Adapter is not installed in the controller.
0 = The terminal on that specific port is powered off (no current connection).
1 = The terminal on that specific port is powered on (connection present).
x = The port is not configured.
– = The terminal or specific port is in a disabled state (no connections possible, unusable).

Station: Indicates the type of terminal to which that specific port is connected.

blank = No station type (port unconfigured)
? = Unknown station type (no station has connected yet)
v = Video display station
p = Printer station
h = Host station

Line: Indicates the number of parity, framing, and overrun errors that have been recorded on that particular port.

. = 0 errors recorded.
: = 1—50 errors recorded.
| = 51—100 errors recorded.
* = Over 100 errors recorded.

Host/term: Indicates the type of host with which the terminal is presently communicating.

When STATION type is "v" (video) or "p" (printer) and the Host/term line is:

blank = No current host connection (if STATUS = 0 or -).
blank = On connection menu (if STATUS = 1).
3 = Connection to 3270 host.
A = Connection to ASCII host.

When STATION type is "h" (host) and the Host/term line is:

blank = No terminal is currently connected to this host port.

(If STATUS = 1, the attached terminal is either on the connection menu or awaiting the next connection.)

(If STATUS = 0, the attached terminal has either powered off or connected to another host destination.)

3 = A 3270 terminal is connected to this host.
A = An ASCII terminal is connected to this host.

LU: Indicates whether or not the SNA session is bound and active.

blank = Session is not bound.
+ = Session is bound (on at least one logical terminal).

Test 12, Option 4

Provides a facility to display the error counters for a particular Asynchronous Emulation Adapter port. The following panel is an example of a disabled adapter and a disabled port.

```
                _____Error Counters for PN 02, HG 21_____

Adapter (HG) status:            Disabled
Port (PN) status:               Powered off due to error
Error counters-

  Framing error:     12345
  Overrun error:     54321
  Parity error:      11111
  Loopback error:    12129

To go directly to other tests, enter: /Test,Option
Select test; press ENTER ===>_




PF:  3=Quit                     12=Test menu
```

Figure 2-87. AEA Error Counters Example: Disabled Adapter and Disabled Port

Test 12, Option 5

Provides a facility to display the connectivity for a particular Asynchronous Emulation Adapter port. The following panel is an example of an enabled adapter and a display/printer connected to an ASCII host.

```
                 _____Connectivity for PN 02, HG 21_____

  Adapter (HG) status:            Enabled
  Port (PN) status:               Powered on
  Device type:                    Video display

  Line speed/Parity               1200 / Odd
  Flow control/Stop bits          XON/XOFF(XON) / 1

  Current connectivity-

        LT   Bound  Host    IDn        HG_PN    Host/Station Name
Addr
        1     n/a   n/a                21_06      ASCII HOST


  To go directly to other tests, enter: /Test,Option
  Select option; press ENTER ===>_

  PF:  3=Quit                    12=Test menu
```

Figure 2-88. Connectivity: Enabled Adapter and Display/Printer with an ASCII Host

Test A Configuration B: Operator-Originated Alerts

Network Problem Determination Aid (NPDA) provides support for 20 product-unique panels that can be defined by the customer in the NPDA data base as part of the host SYSGEN process.

During configuring, one of the following options is selected:

- No alert function
- An alert function without operator-generated alert message capability
- An alert function with operator-generated alert message capability from all ports
- An alert function with operator-generated alert message capability from port 0 only.

When properly filled in, the information on such a screen is transmitted as part of an alert Network Management Vector Transport (NMVT) inbound to the host.

Included in these alert request units (RUs) are the customer-specified user-action code, a 120 (maximum length) test message, and up to three 8-digit qualifiers.

Once the alert is received by NPDA, the user-action code is mapped into one of the unique customer screens. The text message and qualifiers allow the operator to pass such things as a 3174 status code, a port number, and a telephone number, as well as a text message, up to the NPDA operator.

When an authorized display station operator enters TEST mode, types in **/A,n** (n=1A—1H, 2A, 3A) and presses the ENTER key, the following panel is displayed:

```
 /A    Host ID= 1A
XX
----------------------------------------------------------------------
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn ------------------------------
Q1 mmmmmmmm Q2 mmmmmmmm Q3 mmmmmmmm
```

Figure 2-89. Alert Message panel

where,

/A indicates the alert screen is ready for transmission when the Enter key is pressed.
XX is a two-character field for the user-action code 01 – 20 decimal required).
nnnn... is a 120-character field filled with nulls for the text message (optional).
mmmm... are three 8-character fields filled with nulls for the qualifiers (optional).

When the ENTER key is pressed with the above panel, a check is performed to ensure that the user-action code (XX) is a number between 01 and 20 (decimal). If the number is between 01 and 20, the number is translated by the 3174 into the appropriate user-action code and an alert is sent. If an invalid user-action code is entered, the wrong number indicator is displayed in the operator information area.

After an operator-generated alert is sent, the display screen is cleared to prevent accidental retransmission of the message. Only one *operator-generated* alert may be pending with the 3174 at one time. For example, several authorized display station operators may request an alert screen simultaneously. Once an operator fills the screen with the required user-action codes (and any optional text and qualifiers) and presses the ENTER key, that entry is queued for transmission, provided no operator-generated alert is already pending. If a second authorized operator attempts to enter an alert before the first operator-generated alert is transmitted to the host, the second operator's entry is inhibited, the screen is *not* cleared, and the minus function indicator is displayed in the operator information area.

The second operator must press the RESET key and try again. If the first operator's screen has been transmitted and no other operator has entered an alert, the second operator's entry is honored.

Regardless of the upstream response, the screen is cleared. If a link-level error occurs, the hardware will attempt retransmission of the alert. If the data has been lost because of an error above the link level (DACTPU), the information may be lost without any error indication to the operator.

If an attempt is made to request an operator-generated alert screen from an unauthorized display station, the operator unauthorized indicator is displayed in the operator information area.

If other than the basic characters have been entered from the keyboard, the try again (X ? +) indicator is displayed.

If a communication check is detected, the Input Inhibited and Communication Reminder symbols, followed by a 5xx number, are displayed.

Test D Configuration B: Distributed Function Terminal Dump

This test is only available on 1TEST. You may request a dump of a distributed function terminal, such as a 3290, from a 3278 or similar display station. For example, after a 3290 has been downstream-loaded and a failing symptom is present, remove the diskette from diskette drive 1 or 2, and insert the 3174 dump diskette (P/N 73X3726). When the diskette is removed from the 3174, a status code of 38X may appear in the Status indicators. This is a normal indication and stops when the dump diskette has finished loading its control program into controller storage.

Perform the following steps to request a dump of a distributed function terminal.

1. Remove the diskette from drive 1 or 2 and insert the 3174 dump diskette.
2. At an attached terminal, press and hold ALT; press TEST.
3. Type in **/d,n** (n = The port number of the DFT). When the request is successfully received and the dump is initiated, a plus sign (+) will appear adjacent to the n:

   /d,n+

   While the dump is in progress, alternating codes 4671 and 4672 display in the Status indicators on the 3174. After approximately 10 minutes, the dump is completed and a 4675 is displayed in the 3174 Status indicators.
4. Remove the dump diskette.
5. Reinstall the previously removed diskette.
6. Exit test mode.

The terminal for which the dump was taken requires a power-on reset. This ensures a new downstream load of that terminal.

Note: Only one DFT dump is allowed at any given time. If a request is entered for a port that is powered off and does not have a DFT connected (this is a valid request), a DFT dump cannot take place. In approximately 20 seconds, a timer will abort the dump request and clear the DFT dump facility resource. During these 20 seconds, if another dump request is entered, a wrong number indicator appears in the indicator row.

If the DFT dump test request is rejected, one of the following may appear.

X–f appears if another DFT dump is already in progress.
/d,n– appears if a 3174 dump diskette is not available in one of the controller diskette drives.
X #? appears if the terminal that was selected to be dumped is not a distributed function terminal.

General Procedures

This section describes the following procedures:

- How to perform an operator panel lamp test
- How to display the Master Menu
- How to take the 3174 Models 1L and 11L offline
- How to place the 3174 Models 1L and 11L online
- How to force the 3174 Models 1L and 11L offline (two methods)
- How to disconnect the bus/tag interface cables
- How to remove the channel adapter and driver/receiver card
- How to power the Models 1L and 11L on and off
- How to perform the coaxial cable ground loop check
- How to check for a terminal-ready condition
- Modem specifications and switch settings
- How to use the 3174 patch procedure
- How to perform the 3174 dump.

How to Perform an Operator Panel Lamp Test

To test the LEDs in the operator panel display, press and hold the IML pushbutton. All the LEDs should light indicating 8888.

How to Display the Master Menu

The Master Menu (Figure 2-90 on page 2-285) lists the utilities available on the Utility diskette or fixed disk. From this menu, you select the option you want.

To display the Master Menu **using the Utility diskette**:

1. Insert the Utility diskette into diskette drive 1.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. 40 is displayed.
6. Press Enter. The Master Menu is displayed on the terminal connected to port 0 on the 3174.

To display the Master Menu **using the fixed disk**:

1. Press and hold Alt 1.
2. Press and release IML.
3. Release Alt 1.
4. At 40, key in **0340**.(for fixed disk).
5. Press Enter. The Master Menu is displayed on the terminal connected to port 0 on the 3174.

```
                        __Master Menu __

        3174 MICROCODE © COPYRIGHT IBM CORP 1986, 1987, 1988
                Licensed Internal Code - Property of IBM

Select option; press ENTER

 Option   Description
   1      Customize the Control Disk
   2      Merge DSL
   3      Copy Files
   4      Diagnostics
   5      Microcode Upgrade
   6      Encrypt/Decrypt Master Key
   7      Central Site Customizing
   8      Media Management
   K      Identify Customizing Keyboard


 Select ===> __
```

Figure 2-90. Master Menu Panel Configuration A5.0/S5.0 (and previous releases)

```
                        __Master Menu __

        3174 MICROCODE © COPYRIGHT IBM CORP 1986, 1987, 1988 1989
                Licensed Internal Code - Property of IBM

Select option; press ENTER

 Option   Description
   1      Customize the Control Disk
   2      Merge DSL
   3      Copy Files
   4      Diagnostics
   5      Microcode Upgrade
   6      Central Site Customizing
   7      Media Management
   K      Identify Customizing Keyboard


 Select ===> __
```

Figure 2-91. Master Menu Configuration B1.0

The following are the explanations of the options shown on the Master Menu panels.

Customize the Control Disk

Some customizing requires that hardware and software configuration information be either specified or modified on the Control disk that will be used to make a 3174 operational; for example, defining host, device, and printer attachments, modifiable-keyboard types, and RPQs. When you select this procedure, a second menu is displayed. See the *3174 Utilities Guide* for the procedure.

Merge DSL Code

For DSL displays or for the Asynchronous Emulation Adapter (both of which require the controller to downstream-load microcode), there is a separate DSL disk. During this procedure, you merge one DSL disk onto another DSL disk. See *3174 Utilities Guide* for this procedure.

Copy Files

This selection allows you to duplicate valid 3174 disks (Control, DSL, and Utility disks) and copy portions of a Control disk or to modify certain parameters during a copy. See the *3174 Utilities Guide* for this procedure.

Diagnostics

IBM service representatives or customer service personnel can select this procedure to detect and isolate hardware or software problems in the controller.

Microcode Upgrade

When new function or maintenance enhancements are added to a configuration support, IBM sends its customers, at their request, an upgraded Utility, Control, RPQ, or DSL diskette. During this procedure, you merge the customizing data from an already customized Control disk onto the upgraded Control disk. See the *3174 Utilities Guide* for this procedure.

Encrypt/Decrypt

If you have ordered the Encrypt/Decrypt feature for your 3174, you need to use this procedure. The Encrypting/Decrypting procedure protects data from unauthorized disclosure by encrypting data sent from the 3174 to the host system and by decrypting data received by the 3174 from the host system. Only authorized persons should use this procedure. See the *3174 Utilities Guide* for this procedure.

Central Site Customizing

Central Site Customizing allows you to tailor control unit microcode for each controller in a network at a central location. The tailored microcode can then be sent electronically (if you are using the NetView[3] Distribution Manager software package) or physically (on a diskette) to the various controllers in the network, while a copy of the customizing is stored at the central site for future reference. See the *3174 Central Site Customizing User's Guide* for more information on this procedure.

Media Management

If your 3174 Establishment Controller is equipped with at least one fixed disk drive, you may wish to perform this procedure. The Media Management procedure provides a means for managing the data resident on a fixed disk. You may use this procedure to set up a fixed disk in order to IML from it, or you can use this procedure to delete subdirectories that are stored on it. The *3174 Utilities Guide* describes the procedure.

Identify Customizing Keyboard

During this procedure, you identify on a Utility disk the keyboard of the display you are using to customize. The keyboard you specify will be supported on that disk for *all* other customizing procedures *and* any time you recustomize using that disk. See the *3174 Utilities Guide* for more detail on this option.

---

[3] NetView is a trademark of the International Business Machines Corporation.

How to Take the 3174 Offline (Models 1L and 11L Only)

1. Check that the offline indicator is off.

   Note: If the indicator is on, the controller is already offline.

2. Contact the system operator to vary the 3174 and its attached devices offline from the host system.
3. Set the Channel Interface switch to the Offline position. Wait for the offline indicator to light.
4. If the offline indicator does not light, use the procedure "How to Force the 3174 Offline: Alt 1 Method (Models 1L and 11L Only)."

How to Place the 3174 Online (Models 1L and 11L Only)

1. Check that the offline indicator is lit.
2. Set the Channel Interface switch to the Online position.
3. If the Control microcode is not on the fixed disk, insert a Control diskette into diskette drive 1. Insert a DSL diskette into diskette drive 2 as required.
4. If power is on, press the IML pushbutton. If power is off, continue with step 5.

   Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the controller drops power when the Power Control switch is moved from Local to Remote.

5. Set the Power Control switch to Local and switch on power. After IML is completed the offline indicator should turn off.
6. If the offline indicator stays on, go to MAP 0900 (online symptom).
7. If a status code is displayed, go to the *3174 Status Codes* manual.
8. If the power sequence cable is installed, set the Power Control switch to Remote.
9. Contact the system operator to vary the 3174 online.

How to Force the 3174 Offline: Alt 1 Method (Models 1L and 11L Only)

This procedure resets the channel adapter when the adapter does not go to the offline state using the normal method (Channel Interface switch). This procedure would also be used when the controller is hung online and a dump is required for problem isolation.

1. Contact the system operator and have the 3174 and its attached devices varied offline from the host system.
2. Put the Channel Interface switch in the Offline position.
3. Press and hold Alt 1.
4. Press and release IML.
5. Release ALT 1.
6. If the offline indicator does not light, go to the next procedure, "How to Force the 3174 Offline: Power-Down Method" on page 2-288.

How to Force the 3174 Offline: Power-Down Method

1. Contact the system operator and have the 3174 and its attached devices varied offline from the host system.
2. Set the Channel Interface switch to the Offline position.
3. Set the Power Control switch to the Local position.
4. Set the AC power switch to the off position.

Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the controller drops power when the Power Control switch is moved from Local to Remote.

How to Disconnect the Bus and Tag Cables

1. Ask the system operator to vary the 3174 and its attached devices offline from the host system and place the host system in the stop state.
2. Set the Channel Interface switch to the Offline position.

   Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the controller drops power when the Power Control switch is moved from Local to Remote.
3. Set the Power Control switch to the Local position.
4. Wait for the offline indicator to light.
5. If the offline indicator does not light, use the procedure "How to Force the 3174 Offline: Alt 1 Method (Models 1L and 11L Only)" on page 2-287.
6. Disconnect the Tag Out channel cable or the tag terminator assembly.
7. Disconnect the Tag In channel cable.
8. Disconnect the Bus Out channel cable or the bus terminator assembly.
9. Disconnect the Bus In channel cable.
10. If the terminator assemblies were installed in this controller, install them in the preceding controller on the channel or on the ends of the bus and tag cables.
11. If four channel cables were installed, connect the Tag Out cable to the Tag In cable and the Bus Out cable to the Bus In cable.
12. The system can now be placed back in the start state.

How to Remove the Channel Adapter or Channel Driver/Receiver Card

Warning: Perform the following instructions before removing the channel adapter in location 11, or the channel driver/receiver in location 10, to prevent host system failures.

1. Contact the system operator and have the 3174 varied offline from the host system.
2. Set the Channel Interface switch to the offline position.
3. Wait for the offline indicator to light.
4. If the offline indicator does not light, use the procedure "How to Force the 3174 Offline: Alt 1 Method (Models 1L and 11L Only)."

   Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the controller drops power when the Power Control switch is moved from Local to Remote.
5. Set the Power Control switch to the Local position.

6. Switch off power.
7. The channel adapter card can be removed. If removing the channel driver/receiver card, continue with step 8.

Warning: Do not power on the controller with the channel adapter card removed.

8. Record the settings of the priority switches.
9. Set the switches to bypass (see Table 4-1 on page 4-2).
10. Remove the channel driver/receiver card in position 10.
11. Reinstall the removed card(s), and ensure the priority switches are set to their original positions.

How to Power On the 3174 Models 1L and 11L

1. Set the Power Control switch to the Local position.
2. Turn on the power switch and momentarily hold it in the Start position.
3. If a power control sequence cable is connected to the power supply, set the Power Control switch to the Remote position.

Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the control unit drops power when the Power Control switch is moved from Local to Remote.

If a power control sequence cable is not connected, a white jumper plug with pins 1 and 5 connected can be installed in location J6 on the bottom of the power supply. See Figure 4-7 on page 4-10.

How to Power Off the 3174 Models 1L and 11L

1. Take the 3174 offline from the channel. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

Warning: If a power control sequence cable is not connected to the 3174 power supply (J6), the control unit drops power when the Power Control switch is moved from Local to Remote.

2. Set the Power Control switch to the Local position.
3. Turn off the power switch.

How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)

This procedure is used to isolate terminal problems by exchanging a known working terminal, such as a 3278, 3279, 3290, or printer, with another terminal or a 3299 Terminal Multiplexer.

Note: On some terminals, an S, 4, or a 6 is a normal ready condition.

1. At the terminal to be tested, switch the Normal/Test switch from Normal to Test and back again or perform a power-on reset. Some terminals require up to 2 minutes to complete a power-on reset.
2. Check the terminal for the ready symbol (S, 4, or 6) in the operator information area. For printers, check for the appropriate ready indicator. For some terminals, such as a personal computer, you may need to change the mode of the terminal that allows communication with the 3174.
3. If the ready condition is on, the terminal and the port it is attached to are working properly. Return to the MAP that sent you here.
4. If the ready condition is not on, then the hardware configuration from the terminal back to the controller is failing. Return to the MAP that sent you here.

How to Perform the Coaxial Cable Ground Loop Check

CAUTION:
Do not connect or disconnect cables during periods of lightning activity. (For translations of this safety notice, see Safety Notice 5 in *IBM 3174 Safety Notices*, GA27-3824.)

CAUTION:
To avoid the possibility of electrical shock, disconnect all power plugs before connecting or disconnecting cables. Do not reconnect power plugs until connection or disconnection of the cables is completed. (For translations of this safety notice, see Safety Notice 1 in *IBM 3174 Safety Notices*, GA27-3824.)

This procedure is used to test for ground loop problems on each terminal connected by coaxial cable to the controller. This procedure is not to be used with either the IBM Cabling System or telephone twisted-pair cable.

A ground loop is a condition where earth ground is connected to the controller from an external ground source. Ground loops can cause intermittent problems on terminals or other equipment connected to the subsystem. Most ground loops occur through shield problems of the coaxial cable, keyboard grounds, or an internal short in the connected terminal. The shield of the coaxial cable is connected to DC ground. DC ground is only connected to earth ground in the controller but not in the terminals or terminal multiplexers.

Step 1: AC Voltage Check

At the terminal end of the coaxial cable being tested, check for AC voltage between the coaxial cable shield and the terminal frame.

Note: Do not disconnect the coaxial connector from the terminal until you are directed to do so later in this procedure.

a. Set the terminal power on.
b. Set the meter range to measure AC line voltage.
c. At the terminal, connect the meter between the coaxial connector shell and the terminal frame. Do not physically touch either surface.
d. If the meter indicates an AC voltage less than 1 volt, go to "Step 2: Coaxial Resistance Check." If the meter indicates an AC voltage greater than 1 volt, AC ground is not correct. **A hazardous condition exists**. The power cord may be damaged or the AC power source may not be grounded correctly.
e. Set the terminal power switch to OFF.
f. If the terminal is an IBM terminal, remove the power cord from the voltage source and check the terminal power supply for broken insulation, arcing, and the correct wiring of the power cord. If the terminal is not an IBM terminal, notify the customer that there is a ground problem on the terminal or the power source is wired incorrectly. If no problem is found in the terminal, have the customer call an electrician to check the grounding and wiring of the AC power source.
g. Do not continue until the problem is repaired. Repeat steps a through d to verify the repair and continue the ground loop check.

Step 2: Coaxial Resistance Check

At the terminal end of the coaxial cable being tested, check resistance in the coaxial cable.

a. At the terminal, set the Power switch to the Off Position.
b. Connect the meter between the coaxial connector and the terminal frame.
c. Set the meter to the lowest resistance scale.
d. The meter should indicate a reading between 0 and 6 ohms. If the meter reading is correct, go to "Step 3: Terminal Ground Check" on page 2-291.
e. If the reading is higher than 6 ohms, there is a high resistance because the coaxial cable shield is not grounded correctly at the controller end of the cable.

This may be caused by:

- An open coaxial shield
- An open coaxial cable (not connected at the controller).

f. Do not continue until the problem is corrected. After the problem is corrected, repeat steps a through d to verify the repair and continue the ground loop check.

Step 3: Terminal Ground Check

At the terminal end of the coaxial cable being tested, check for a ground on the coaxial cable connector in the terminal.

a. Disconnect the coaxial cable from the terminal.
b. Connect the meter between the coaxial connector body (on the terminal) and the terminal frame.
c. Set the meter to the highest resistance scale.
d. If the meter does not indicate a reading of infinity or a very high resistance, there is a short to ground in the terminal between the coaxial connector body and the terminal frame ground. If the meter reading is correct, go to "Step 4: Coaxial Cable to Terminal Check."
   - If this is an IBM terminal, repair the short in the terminal. Repeat steps a through d to verify the repair. If this is not an IBM terminal, report the problem to the customer. The customer is responsible for the repair or replacement of non-IBM devices. After the terminal is repaired, repeat steps a through d to verify the repair.
e. Connect the coaxial cable to the terminal.
f. Go to the controller to continue the ground loop check.

Step 4: Coaxial Cable to Terminal Check

At the controller end of the cable, check for a ground in the coaxial cable.

a. At the controller:
   1) Disconnect the coaxial cable from the controller coaxial connector.
   2) Set the meter range to the highest resistance scale.
   3) Connect the meter between the coaxial cable shell and the controller frame.
   4) If the meter does not indicate a reading of infinity or a very high resistance (meg-ohms), there is a low resistance ground in the coaxial cable. If the meter reading is correct repeat Step 4 on any remaining coaxial cables.

      This may be caused by:
      - A pinched coaxial cable
      - A grounded shield on the coaxial cable
      - A bad lightning protective device on the coaxial cable.

b. Have the customer correct the problem.
c. When the problem is corrected, repeat steps a 1) through a 4) to verify the repair.

If all problems have been repaired or there are no failures of the coaxial cable that was just tested:

a. Reconnect the coaxial cable at both ends.
b. Set the Power switch on the terminal to the ON position.
c. Repeat Step 4 on any remaining coaxial cables.

Modem Specifications and Switch Settings

Modems

The Asynchronous Emulation Adapter feature supports leased line, switched line, and limited distance modems that provide full-duplex asynchronous operation, and equal transmit and receive speeds, and that conform to EIA 232D specifications. The AEA feature also supports auto-call modems that conform to the EIA 232D specifications and to the IBM Attention Command Set (AT), the Hayes AT command set, the Micom[4] auto-dial procedure, or AEA manual calling requirement.

Note: The following information on modem specifications and switch settings apply to modems connected to an Asynchronous Emulation Adapter (AEA) port.

IBM 5841 and 5842, Hayes SmartModem 300 and 1200, and Micom Data Modems, Models 3012 and 3024, are intelligent modems supported for auto-dial to ASCII hosts. The dial strings may be either stored in the 3174 at customizing, or entered from a display station keyboard (manual dial).

For automatic calling (autocall), the AEA's interface to IBM, Hayes, and Micom intelligent modems conforms to the specification in the documentation supplied with each modem. For manual calling, the AEA acts only as a conduit for a user-to-modem conversation; the user represents the interface to the intelligent modem, and must have a detailed understanding of the modem's commands and responses.

These modems should be set up following these general specifications:

- Asynchronous, EIA 232D transmission
- 300 or 1200 bits per second (IBM 5842 can operate at 2400 bits per second)
- Auto-answer or auto-dial
- For auto-dial operation, 9- or 10-bit character length (start, parity, and stop bits are included) is required.

[4] Micom is a trademark of Micom Systems, Incorporated.

IBM 5841 and 5842 Setup

IBM 5841 and 5842 modems are operated in Attention Command Set (AT) mode; any parameters set by commands that are required for operation with the AEA feature are the same as for Hayes modems. However, the switch settings for IBM 584x modems are not compatible with Hayes, and must be set as specified here.

For the IBM 5842 modem, the six front panel switches must be in the "out" position. In addition, the eight configuration switches must be set as described in Table 2-24.

Table 2-24. IBM 584x Modem Switch Settings

Switch Number	Option Name	Switch Setting	Description
1	Receive Line Signal Detect (RLSD)	ON	RLSD (also called 'Carrier Detect)' is raised at connection time.
2	Reset to Default Options on Loss of DTR	OFF	When this switch is set to OFF, the 3174 can reset the modem to a known state by dropping DTR. If register settings are not required for special installation requirements, this reset can be used to avoid unexpected results that can arise from previous use. Not used on 5841.
3	Transmit Timing Option (Synchronous mode only)	Not Used	
4	Asynchronous or Synchronous Mode	ON	Asynchronous mode is used.
5	Source of Data Terminal Ready (DTR)	ON	AEA controls DTR.
6	Transmit Clocking from Remote Modem (Synchronous Mode Only)	Not applicable	
7	Request to Send (RTS)	OFF	AEA controls RTS.
8	Data Set Ready (DSR)	ON (5841 only) OFF (5842 only)	DSR must always be on for 5841. DSR is raised at connection for 5842.

Hayes SmartModem 1200 Setup

A Hayes SmartModem 1200[5] should be set up as described in Table 2-25. Once the Hayes modem is turned on, many of the operating parameters or default values may be overridden by keyboard commands entered during Online Test 12 (/12 test). See "Test 12: Asynchronous Emulation Adapter Tests" on page 2-213 for Test 12 procedures. In Table 2-25, a register number is the Hayes S Register number that can be set by sending commands to the modem from the keyboard.

Table 2-25. Hayes SmartModem 1200 Configuration Switch Settings

Switch Number	Option Name	Switch Setting	Description
1	Data Terminal Ready (DTR)	UP	The station supports DTR.
2	Connection indication state format	UP	The results are sent as messages in English (also see V command).
3	Connection state indication	DOWN	Results are sent (also see Q command).
4	Command mode echo	UP	All characters sent to the modem while it is in command state are echoed back to the display.
5	Automatic answer	UP	The modem answers incoming calls (after a number of rings specified in register S0 [default = 1]).
6	Carrier Detect (CD) lead handling	UP	Carrier Detect reflects carrier (DOWN during command mode).
7	Telephone jack	Not Used	UP = Single line RJ11 jack DOWN = Multiple line RJ12 or RJ13 jack. Should match your installation.
8	Command mode recognition	DOWN	The modem recognizes its commands before connection and its command mode escape during a connection.

[5] Trademark of Hayes Microcomputer Products, Incorporated.

Table 2-26. Hayes SmartModem 1200 S Register Settings

Register Number	Description
0	Ring to answer on. See switch 5 in Table 2-25 on page 2-294. Not relevant to AEA operation.
2	Escape code. Not relevant to AEA operation.
3	Carriage return code. Command and result code terminator can be changed for nonstandard equipment. Set to 13 (default).
4	Line feed code. Line feed follows carriage return when English result codes are selected. Set to 10 (default).
5	Backspace code. Not relevant to AEA operation.
6	Wait for dial tone (default = 2 seconds). The amount of time the modem waits for dial tone. Not relevant to AEA operation.
7	Wait for carrier (default = 30 seconds). The amount of time the modem waits for the remote station to answer before terminating the call. Not relevant to AEA operation.
8	Pause time (caused by comma in dial string)(default = 2 seconds). Not relevant to AEA operation.
9	Carrier Detect Delay. Not relevant to AEA operation.
10	Delay time between carrier loss and outage notification (default = .7 second). Not relevant to AEA operation.
11	Tone dialing speed (default = 0.070 second). Should be set to match the central telephone switch of PBX. Not relevant to AEA operation.
12	Escape to command mode guard time (default = 1 second). Not relevant to AEA operation.
16	Self Test mode (default = 0). This may be set to 1 by using online Test 12 to run modem tests. For autocall operation, register 16 must be set to 0 (default).

Micom Data Modems

S1 and S2 switch groups on Micom's 3012 and 3024 modems should be set to OFF. Other setup options can be set by using the modem's configuration menu. This menu is accessed by using online Test 12 (see "Test 12: Asynchronous Emulation Adapter Tests" on page 2-213 for the procedure). The default settings are suitable to AEA operation.

How to Use the 3174 Patch Procedure

The patch procedure provides the ability either to add two types of patches or to process an existing patch. The two types of patches that can be added are PC and Zap patches. When a patch is added, a check digit and a line count are entered as part of the patch data to verify all patch data has been keyed in correctly. The patch(s) can be installed either on the diskettes or the fixed disks. Sixty patches can be installed on the Control disk, 60 on the Utility disk, and 60 on the DSL disk.

PC Patches

PC patches are applied only to the link-edited microcode that is contained on the Control disk. PC patches are prefixed with the letters "PC." PC patches are not connected in any way with the IBM Personal Computer. When these patches are added, they are displayed on the patches panel of the Control disk. When a PC patch is added, data is entered only on those panels that are required for the patch being added. When a panel is displayed that does not require any input, use PF8 to bypass that panel or PF12 to process the patch if all the required patch data has been entered.

Zap Patches

Zap patches are applied to prelinked microcode that is contained on the Control, Utility (also the Limited Function Utility), or DSL disk. Zap patches are prefixed with the letters ZC, ZU, or ZM. ZC means the patch is applied to the microcode on the Control disk. ZU means the patch is applied to the microcode on the Utility disk. ZM means the patch is applied to the microcode on the DSL disk.

Processing a Patch

This procedure provides the capability of including a patch during an IML, omitting a patch from an IML, or deleting a patch from the control, Utility, or DSL disk.

Starting the Patch Procedure

If you are using a Utility diskette:

1. Insert the Utility diskette in diskette drive 1.
2. Press hold Alt 1; press and release IML.
3. Release Alt 1.
4. At 40, key in the IML device (DS)
   DS = 01 (diskette 1), 02 (diskette 2, 03 (fixed disk 1), or 04 (fixed disk 2) and the function selection (FS)
   FS = 40.
5. Press Enter.
6. Go to the terminal connected to port 0.

   If the Utility microcode is on a fixed disk:

   a. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-119.

   b. At 4001, key in the IML device (DS)
      DS = 01 (diskette 1), 02 (diskette 2, 03 (fixed disk 1), or 04 (fixed disk 2) and the function selection (FS)
      FS = 40.

   c. Press Enter.

   d. Go to the terminal connected to port 0.

      The Master Menu is displayed.

   e. Type in **P**. This option is not shown on the menu.

   f. Press ENTER. The Patch Menu is displayed on your terminal. See Figure 2-92 on page 2-297.

```
                    _____ Patch Menu _____

Option        Description

  1           Patch Control Dsk
  2           Patch Utility Dsk
  3           Patch DSL Dsk
  4           Patch Limited Function Utility Disk




Select ===>_

Select option, press ENTER
```

Figure 2-92. Patch Menu

g. Select the Option number of the disk you are patching.

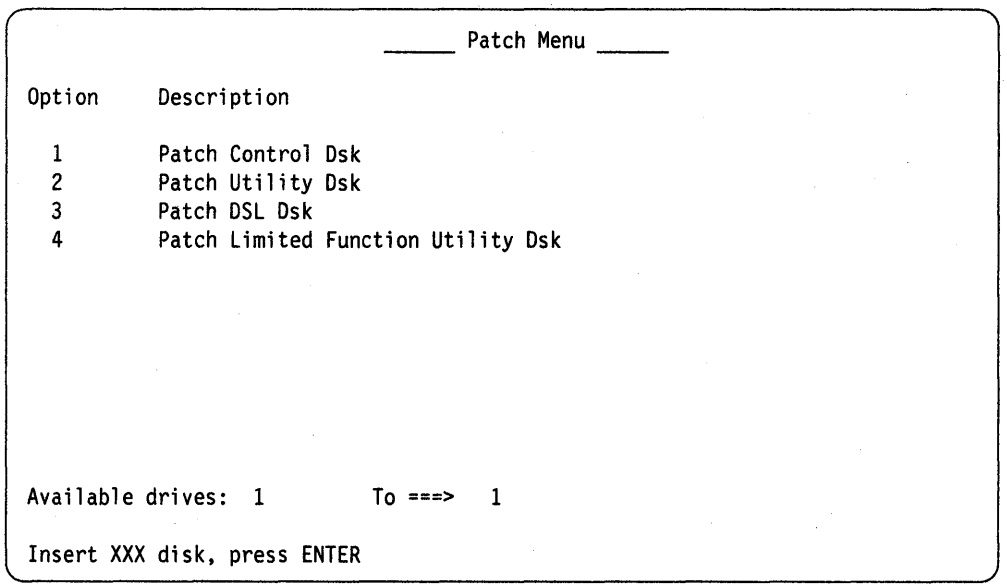
h. Press ENTER. The following panel is displayed on your terminal and the line containing the selected disk is highlighted.

```
                    _____ Patch Menu _____

Option     Description

  1        Patch Control Dsk
  2        Patch Utility Dsk
  3        Patch DSL Dsk
  4        Patch Limited Function Utility Disk




Available drives:  1 2 3 4   To ===>  1

Verify drive selection, press ENTER
```

Figure 2-93. Disk Drive Selection Menu

i. Type in **1**, **2**, **3**, or **4** for your To (or target) drive. For example, if you have two diskette drives installed (Available drives would be 1 and 2) and you wish to use drive 2 for the disk being patched, change the target number to 2. Of course if you have only one diskette drive installed, you must leave the target number set to 1.

j. Press ENTER. The following panel is displayed on your terminal.



XXX = the disk you selected to patch. This message does not appear if you are patching a fixed disk.

Figure 2-94. Disk Drive Selection Menu

k. If you are patching a fixed disk, go to step l. Insert the selected diskette into the target drive.

l. Press ENTER.

The Patches panel is displayed (see Figure 2-95 on page 2-299).

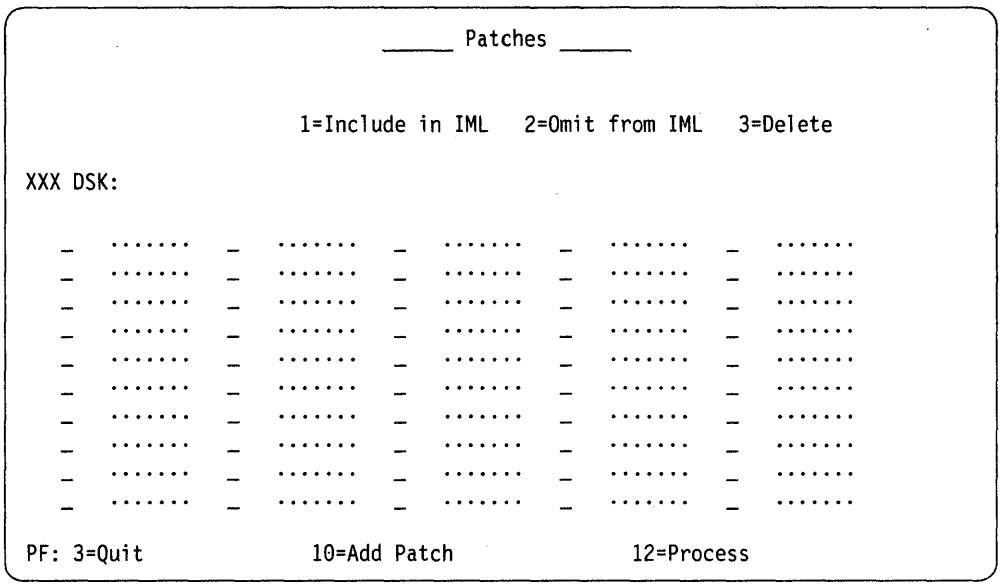
To add a patch, go to "Adding a Patch."

To add a Zap patch, go to "Adding a Zap Patch" on page 2-302.

To process a patch, go to "Processing an Existing Patch" on page 2-304.

Adding a Patch

The Patches panel shown in Figure 2-95 on page 2-299 does not show any patches installed. If patches were previously installed, the patch numbers would be displayed with a 1 or 2 next to the patch number.



XXX = the disk you selected to patch.

Figure 2-95. Patches Panel

1. Press PF10.

   The following panels are displayed:

   a. Patch Header panel (see Figure 2-96 on page 2-300)
   b. Patch Data panel (see Figure 2-97 on page 2-300)
   c. Relocatable Information panel (see Figure 2-98 on page 2-301)
   d. Call to Patch Area panel (see Figure 2-99 on page 2-301).

2. Fill in the fields as required for the patch being added.

3. Press PF12 or PA2 on keyboards that do not have a PF12 key.

The patch processes and the Patches panel appears with the new patch number displayed.

Enter data only on the panels required by the patch being installed. If the patch data does not indicate a particular panel must be filled in, press PF8 to bypass that panel.

```
                         _____ Patch Header _____

               Patch ID ............... _____

               Microcode Level ......... ____

               Line Count ............. __

               Clan ................... ___

               Selection Criteria ...... 001F

               Check Digit............. _

PF :3=Quit               8=Fwd
```

Figure 2-96. Patch Header Panel

```
                          _____ Patch Data _____

     CSECT Name ........ ___                   CSECT Alignment........004

      Text                     Text                          Check
     Offset                 Code/Data                        Digit

     _____     ___ ___ ___ ___ ___ ___ ___ ___                 _

     _____     ___ ___ ___ ___ ___ ___ ___ ___                 _

     _____     ___ ___ ___ ___ ___ ___ ___ ___                 _

     _____     ___ ___ ___ ___ ___ ___ ___ ___                 _

     _____     ___ ___ ___ ___ ___ ___ ___ ___                 _

PF: 3=Quit              8=Fwd                    11=More
```

Figure 2-97. Patch Data Panel

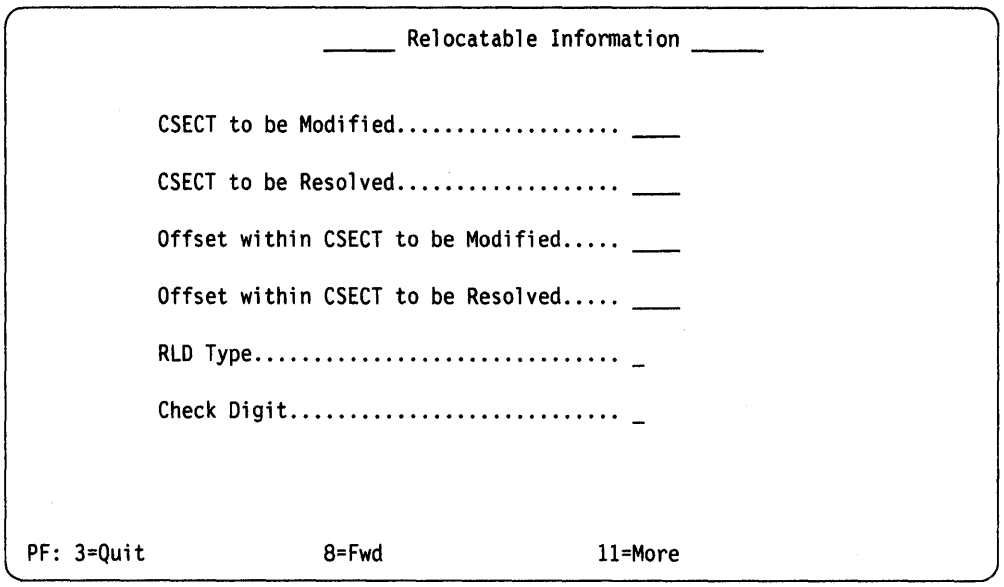


Figure 2-98. Relocatable Information Panel

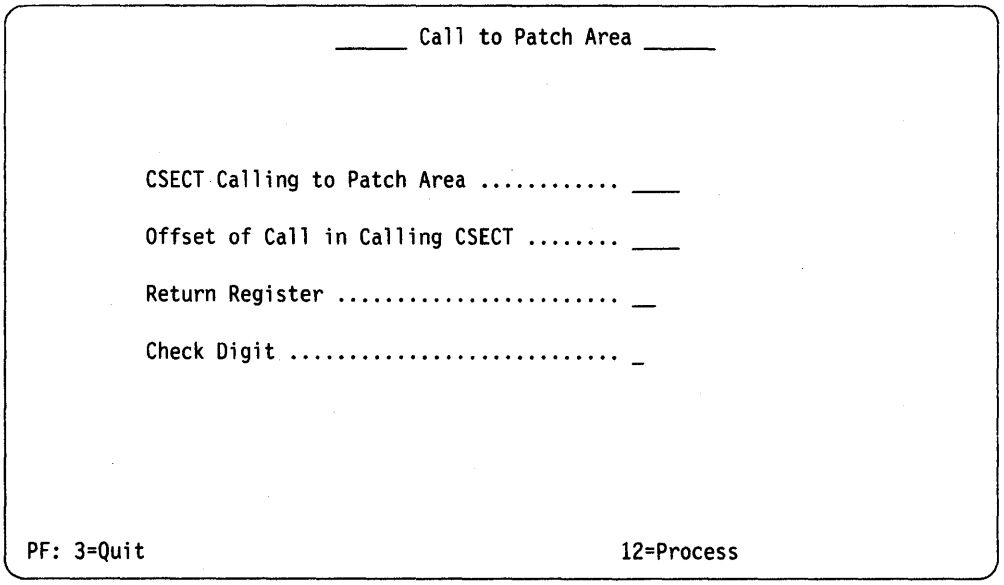


Figure 2-99. Call to Patch Area Panel

Adding a Zap Patch

Figure 2-100 shows the Patches panel before a Zap patch is added.

```
                          _____ Patches _____

                    1=Include in IML  2=Omit from IML  3=Delete
XXX DSK:

   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......
   _  .......   _  .......   _  .......   _  .......   _  .......


 PF: 3=Quit              10=Add Patch              12=Process
```

XXX = the disk you selected to patch.

Figure 2-100. Patches Panel (Adding a Zap Patch)

1. Press PF10.

   The following panels display:

   a. Patch Header panel (see Figure 2-101 on page 2-303)

   b. Zap Patch panel (see Figure 2-102 on page 2-303).

2. Fill in the fields as required for the patch being added.

3. Press PF12 (or PA2 on keyboards that do not have a PF12 key).

   The patch processes and the Patches panel appears with the new patch number displayed.

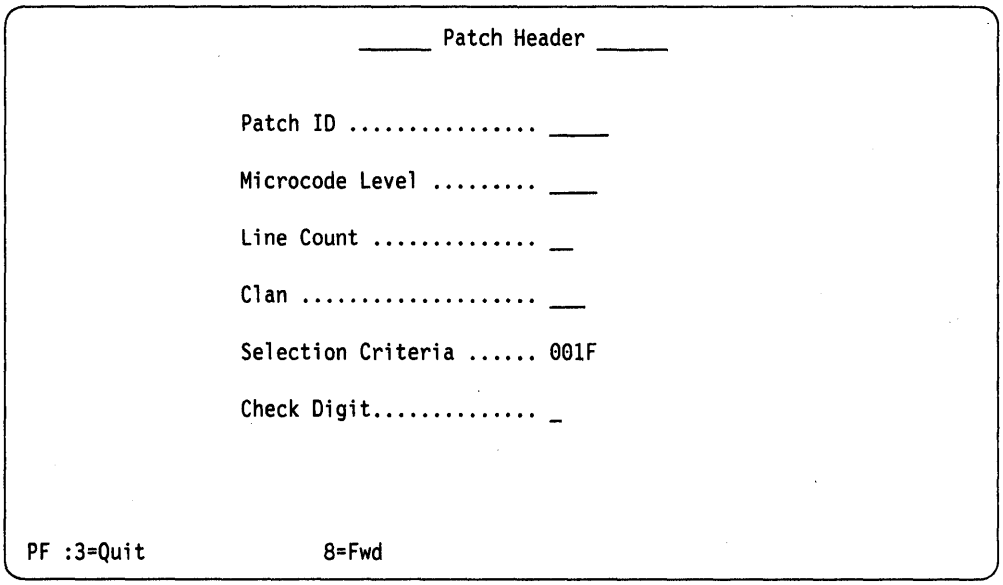


Figure 2-101. Patch Header Panel (Adding a Zap Patch)

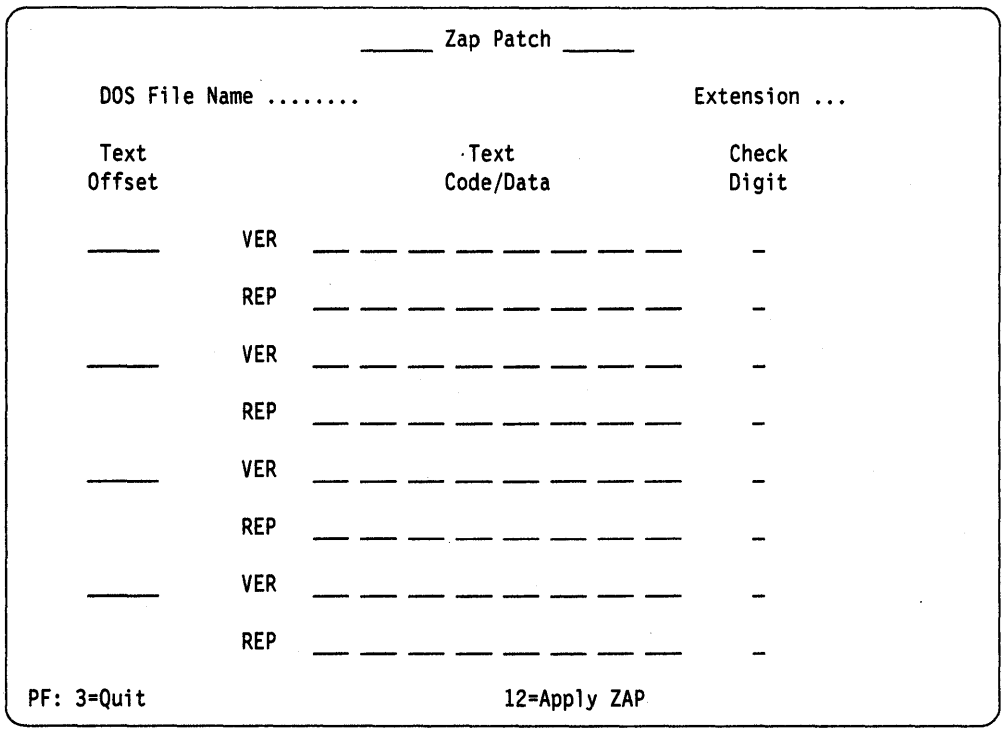


Figure 2-102. Zap Patch Panel

Processing an Existing Patch

The panel in Figure 2-103 shows one patch installed on the Control disk. Option 2 is in the field next to the patch number, which means this patch is not loaded when a normal IML is performed. To change this option:

1. Move the cursor under the 2.
2. Type in **1** or **3** where:

   1 loads the patch when a normal IML is performed.

   3 deletes the patch from the disk.

   Warning: When option 3 is entered, the patch is deleted when PF12 is pressed. Be sure the patch selected for deletion is the correct patch number.
3. Press PF12 (or PA2 on keyboards that do not have a PF12 key).

   The patch processes and the Patches menu reappears, reflecting the changed option number or deleted patch.

```
                          ——— Patches ———

                    1=Include in IML  2=Omit from IML  3=Delete
CTL DSK:

    2   PC11111   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......
    –   .......   –   .......   –   .......   –   .......   –   .......


PF: 3=Quit              10=Add Patch              12=Process
```

Figure 2-103. Patches Panel with One Patch Installed

How to Perform the 3174 Dump Procedure

The 3174 dump procedure is a standalone program that is contained on its own diskette. The dump diskette (P/N 73X3726) is obtained from an IBM Parts Distribution Center. The following information can be retrieved from the controller by use of the dump procedure:

- Controller Storage and Register Space
- Controller Unit Memory Mapped I/O (MMIO)
- Control Disk Link-Edit Map
- Control Disk Configuration Files
- Control Disk Event Log and Trace.

The dump procedure is performed at the 3174 operator panel. The 3174 must be offline from the host system. This procedure requires a 3174 dump diskette and is performed when the controller is in its failing state.

Note: Multiple dump diskettes may be required to dump all of machine storage.

1. Remove the diskette from diskette drive 1.
2. Insert the 3174 dump diskette.

Warning: If the following steps are not performed properly, the dump information may be DESTROYED.

3. Press and hold Alt 1.
4. Press and release IML.
5. Release Alt 1.
6. At 40 press ENTER.
7. The following status codes are displayed:

   5901 5902 5903 5904 5905

   Note: If any status code that is outside the range 5901 to 5918 is displayed see the *3174 Status Codes* manual.

8. At 5907, remove the dump diskette and insert the Control diskette.

   Note: If the 3174 was IMLed from a fixed disk, this prompt will not appear. The files that would normally be copied from the Control diskette will be copied from the fixed disk.

   Do NOT press any operator panel keys at this time.

9. The following status codes are displayed: 5908 5909.
10. At 5910, remove the Control diskette and insert the original dump diskette.

    Note: If the 3174 was IMLed from a fixed disk, this prompt will not appear.

11. The following status codes are displayed: 5912 5913.
12. If status code 5914 is displayed, remove the dump diskette and insert another dump diskette. If 5914 is not displayed, go to the next step.
13. At 5916, remove the dump diskette. The dump is completed. Save this diskette for analysis.
14. If 5919 or 5921 is displayed, the contents of the dump may not be valid. In this case, record the additional fields and perform the following procedure:
    a. Remove the dump diskette.
    b. Save this dump diskette for analysis.
    c. Perform an Alt 2 IML to verify proper operation of the controller. See the "Alt 2 IML Procedures (Test 82)" on page 1-56.
    d. Re-create the failure.
    e. Perform the dump procedure again.
    f. Save this dump diskette for analysis.

How to Analyze a 3174 Dump Failure

This procedure provides an analysis of status codes 5919 and 5921. These status codes can occur while performing the 3174 dump procedure if a failure occurs in machine storage. The following describes the additional fields of status code 5919 and 5921.

5919 WXYZ BNBN BNBN 99MU 00

Where 99MU is included before the final 00, only if there are CCA errors. A CCA error is a CCA hang (time out) or a parity error in a CCA register and or CCA ram. A CCA dump (or CCA error) will be taken only for a CCA that was initialized on the previous Control microcode IML.

Where:
99 = An error was reported while dumping one or more CCAs.
M = An indicator for each CCA with an error.
M = 1 = HG 51 error
M = 2 = HG 52 error
M = 3 = HG 51 and HG 52 error.

U = not used at present.

WX indicates the dump copy status of files that are required to be copied from the Control diskette that was being used at the time of the failure. Depending on the problem that has occurred with the controller, not all files are required to analyze a dump. Use your support structure to determine if the dump was valid.

BN = The block number of main storage or MMIO adapter on card storage, in 256KB blocks, that contained an ECC or parity error. Normally storage errors should not be indicated during a dump procedure. The FRU(s) in the location indicated with errors are suspect and should be exchanged.

Where W is equal to:
- 0 = One group of all files copied
- 1 = Link map not copied
- 2 = Event Log / Trace file not copied (RAS)
- 3 = Log and Link map not copied
- 4 = CDID file not copied
- 5 = Link map and CDID files not copied
- 6 = Log and CDID files not copied
- 7 = Link Map and Log and CDID files not copied

Where X is equal to :
- 0 = One group of three files copied
- 1 = CCA Trace file not copied
- 2 = CCA 51 Link map not copied
- 3 = CCA Trace and CCA 51 Link map not copied
- 4 = CCA 52 Link map not copied
- 5 = CCA Trace and CCA 52 Link map not copied
- 6 = CCA 51 and CCA 52 Link map not copied
- 7 = CCA Trace and CCA 51 and 52 Link maps not copied

BN =			
	01 =	Main storage failure	Card location 19
	02 =	Main storage failure	Card location 19
	03 =	Main storage failure	Card location 19
	04 =	Main storage failure	Card location 19
	05 =	Main storage failure	Card location 20
	06 =	Main storage failure	Card location 20

07 =	Main storage failure	Card location 20 or 17 *
08 =	Main storage failure	Card location 20 or 17 *
09 =	Main storage failure	Card location 17
10 =	Main storage failure	Card location 17
11 =	Main storage failure	Card location 17
12 =	Main storage failure	Card location 17
13 =	Main storage failure	Card location
14 =	Main storage failure	Card location
15 =	Main storage failure	Card location
16 =	Main storage failure	Card location
17 =	Main storage failure	Card location
18 =	Main storage failure	Card location
19 =	Main storage failure	Card location
20 =	Main storage failure	Card location
21 =	Main storage failure	Card location
22 =	Main storage failure	Card location
23 =	Main storage failure	Card location
24 =	Main storage failure	Card location
25 =	MMIO Adapter	Card location 17
26 =	MMIO Adapter	Not used
27 =	MMIO Adapter	Card location 16
28 =	MMIO Adapter	Card location 15
29 =	MMIO Adapter	Card location 14
30 =	MMIO Adapter	Card location 13
31 =	MMIO Adapter	Card location 12
31 =	MMIO Adapter	Card location 11

*If card location 20 contains FRU type 9052, BN 07 and 08 are in card location 20. If card location 20 contains FRU type 9051, BN 07 and 08 are in card location 17.

3174 Display Subsystem OLTs

This section describes the online tests (OLTs) for Models 1L, 1R, 2R, 11L, 11R, and 12R. (SNA and non-SNA).

Warning: While running OLTs, DO NOT PRESS any keys on any terminals attached to the controller being tested. False errors or unexpected failures may occur.

Models 1L and 11L (SNA) (3174B OLTs)

This OLT provides testing for the 3174 Models 1L and 11L (SNA) display subsystem local channel attachment and supplements the testing that is performed during the IML sequences of the 3174 Models 1L and 11L. For additional information, see *OLTs User's Guide*, D99-3174D.

Prior to invocation of the OLT, the 3174 must complete its IML sequence; that is, the 3174 operational microcode is in control and ready for I/O operation with the host.

Applicable Executive Control Program

These OLTs are compatible with the following control programs at the levels indicated or higher:

OLTSEP 9.0
TCAM TOTE 10
DOS OLTEP 26
OS OLTEP 21.8
OS/VS1 OLTEP 6
DOS/VS OLTEP 33
OS/VS2 SVS OLTEP 1.7
OS/VS2 MVS OLTEP 3.7

Composite Error Message Description

The following is an example of a maximum configuration of error message content for Models 1L and 11L (SNA), with an explanation of each item.

```
Item Content

 1.  T3174B - v1 RTN nn DEV/LN ccuu ECAec REFNUM yyzzz
 2.  PLINK ID = X3174ss-v1
 3.  Test and failure description (can be a total of 8 lines)
 4.  CCW01 command address flags count CAW address
 5.  CCWnn command address flags count
 6.  XPTD CSW1 XX last ccwaddr+ 8 status count
 7.  RCVD CSW1 X0 last ccwaddr+ 8 status count
 8.  XPTD CSW2 XX last ccwaddr+ 8 status count
 9.  RCVD CSW2 X0 last ccwaddr+ 8 status count
10.  XPTD CC condition code RCVD CC condition code
11.  XPTD SNS sense data
12.  RCVD SNS sense data
13.  XPTD DATA expected data
14.  RCVD DATA received data
15.  WRTN DATA write data
16.  Test message (can be up to 9 lines)
Item     Explanation

1        This is the standard header line provided by OLT(s) EP:
         T3174B       ID of 3174 Models 1L and 11L OLT root module
```

	v1	Version and level of root module
	nn	Decimal value of routine number
	ccuu	Address of 3174 Models 1L and 11L
	ec	FE announcement letter number describing a required change
	yyzzz	Hexadecimal equivalent of routine number and error ID within that routine
2	X3174ss	ID of active test module during error
	v1	Version and level of test module

Note:
A PLINK ID of XXXXXXXXXX means no plink module was active when the error occurred.

3 These lines provide the name of the test and the failure description. These lines are printed in all error messages.

4 - 5 These lines define the CCWs and CAW issued at the time of the error. These lines are printed in all error messages.

6 - 7 These lines contain the hexadecimal data for the expected and received CSWs.
These lines are printed in all error messages except for timeout of the I/O event.

8 - 7 These lines contain the hexadecimal data for the expected and received CSWs for the second interrupt (if there is one). These lines are printed only when the expected and received CSWs are not equal to zero.

10 The expected and received condition codes. This line is printed only when the expected and received CCs are not equal.

11 - 12 These lines contain the hexadecimal data for the expected when the expected and received SNSs are not equal. The sense bits are defined below.

Byte 0		Byte 1	
Bit 0	Command reject	Bit 0	Data length check
1	Intervention required	1	Data reject
2	Bus out check	2	This bit is not assigned
3	Equipment check	3	This bit is not assigned
4	Data check	4	Parity check modifier
5	Overrun (bit not used)	5	Parity check number 1
6	Not initialized	6	Parity check number 2
7	This bit is not assigned	7	Cycle steal machine check

13 - 14 Lines 13 and 14 contain the hexadecimal data for the expected and received data (if any). These lines are printed in all error messages where the failing routine executed a read type command.

15 The hexadecimal write data (if any). These lines are printed in all error messages where the failing routine executed a write type command.

16 These lines may be used to provide additional messages for the error printout.

OLT Routines

Table 2-27 lists the T3174B online test routines. Included are the Kingston control number, the module identification, the routine numbers, and the titles.

Table 2-27. T3174B OLT Routines

K No.	Module ID	Routine No. Dec	Routine No. HEX	Title
K745	X3174AA	1	01	Test No Op Control Command
K746	X3174AB	2	02	Test Sense ID Command
K747	X3174AC	3	03	Test Vary Activate Sequence
K748	X3174AD	4	04	Test Vary Deactivate Sequence

CDS Card Format, Models 1L and 11L (SNA)

The following table shows the CDS card format for the local 3174 Models 1L and 11L (SNA) display subsystem online tests.

Card Column	Equivalent CDS Byte	Content
1	_	Leave blank
2 - 4	_	CDS
5 - 9	_	Leave blank
10 - 17	0 -3	Channel, controller device address
18 - 21	4 - 5	Leave blank
22 - 23	6	40 = Class code
24 - 25	7	F3 = type code
26 - 35	8 - 11	Leave blank
36	_	Slash (/) - End of CDS

Models 1L and 11L (Non-SNA) (3174A OLTs)

This OLT provides testing for the 3174 Models 1L and 11L (non-SNA) display subsystem local channel attachment and supplements the testing that is performed during the IML sequences of the 3174 Models 1L and 11L. For additional information, see *OLTs User's Guide*, D99-3174D.

Prior to invocation of the OLT, the 3174 must complete its IML sequence; that is, the 3174 operational microcode is in control and ready for I/O operation with the host.

Applicable Executive Control Program

These OLTs are compatible with the following control programs at the levels indicated or higher:

OLTSEP 9.0
DOS OLTEP 26
TCAM TOTE 10
OS OLTEP 21.8
VTAM TOLTEP 2.0
OS/VS1 OLTEP 6
DOS/VS OLTEP 33
OS/VS2 SVS OLTEP 1.7
OS/VS2 MVS OLTEP 3.7

Composite Error Message Description

The following is an example of a maximum configuration of error message content for Models 1L and 11L (non-SNA), with an explanation of each item.

Item Content

```
 1.  T3174A - v1 RTN nn DEV/LN ccuu ECAec REFNUM yyzzz
 2.  PLINK ID = X3174ss-v1
 3.  Test and failure description (can be a total of 8 lines)
 4.  CCW01 command address flags count CAW address
 5.  CCWnn command address flags count
 6.  XPTD CSW1 XX last ccwaddr+ 8 status count
 7.  RCVD CSW1 X0 last ccwaddr+ 8 status count
 8.  XPTD CSW2 XX last ccwaddr+ 8 status count
 9.  RCVD CSW2 X0 last ccwaddr+ 8 status count
10.  XPTD CC condition code RCVD CC condition code
11.  XPTD SNS sense data
12.  RCVD SNS sense data
13.  XPTD DATA expected data
14.  RCVD DATA received data
15.  WRTN DATA write data
16.  Test message (can be up to 9 lines)
```

Item	Explanation
1	This is the standard header line provided by OLT(s) EP: T3174A — ID of 3174 Models 1L and 11L (non-SNA) OLT root module v1 — Version and level of root module nn — Decimal value of routine number ccuu — Address of 3174 Models 1L and 11L ec — FE announcement letter number describing a required change yyzzz — Hexadecimal equivalent of routine number and error ID within that routine
2	U3174ss — ID of active test module during error v1 — Version and level of test module Note: A PLINK ID of XXXXXXXXXX means no plink module was active when the error occurred.
3	These lines provide the name of the test and the failure description. These lines are printed in all error messages.
4 - 5	These lines define the CCWs and CAW issued at the time of the error. These lines are printed in all error messages.
6 - 7	These lines contain the hexadecimal data for the expected and received CSWs. These lines are printed in all error messages except for timeout of the I/O event.
8 - 7	These lines contain the hexadecimal data for the expected and received CSWs for the second interrupt (if there is one). These lines are printed only when the expected and received CSWs are not equal to zero.
10	The expected and received condition codes. This line is printed only when the expected and received CCs are not equal.

11 - 12 These lines contain the hexadecimal data for the expected and received sense data (if any). These lines are printed only when the expected and received SNSs are not equal.

13 - 14 Lines 13 and 14 contain the hexadecimal data for the expected and received data (if any). These lines are printed in all error messages where the failing routine executed a read type command.

15 The hexadecimal write data (if any). These lines are printed in all error messages where the failing routine executed a write type command.

16 These lines may be used to provide additional messages for the error printout.

Figure 2-104. Example of Maximum Configuration of Error Message Content, Models 1L and 11L (non SNA)

OLT Routines

Table 2-28 lists the T3174A online test routines. Included are the Kingston control number, the module identification, the routine numbers, and the titles.

Table 2-28. T3174A OLT Routines

K No.	Module ID	Routine No. Dec HEX	Title
K721	U3174AA	1 01	Test No Op Control Command
K722	U3174AB	2 02	Test Valid Commands for Acceptance
K723	U3174AC	3 03	Test Invalid Commands and Sense Command Operation
K725	U3174AE	5 05	Test Sense ID Commands
K728	U3174AH	3 03	Test Chained Commands
K731	U3174AK	11 0B	Test Unchained Commands

CDS Card Format, Models 1L and 11L (Non-SNA)

The following table shows the CDS card format for the local 3174 Models 1L and 11L (non-SNA) display subsystem online tests.

Table 2-29 (Page 1 of 2). CDS card format &mode1l. (non-SNA)

Card Column	Equivalent CDS Byte	Content
1	_	Leave blank
2 - 4	_	CDS
5 - 9	_	Leave blank
10 - 17	0 -3	Channel, controller device address
18 - 19	4	Leave blank
20 - 21	5	Must be 00
22 - 23	6	10 = Class code

Table 2-29 (Page 2 of 2). CDS card format &mode1l. (non-SNA)		
Card Column	**Equivalent CDS Byte**	**Content**
24 - 25	7	11 = type code
26 - 35	8 - 11	Leave blank
36	_	Slash (/) - End of CDS

Models 1L, 1R, 2R, 11L, 11R, and 12R OLTs

These OLTs provide path testing for the 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R display subsystem host attachment downline from a 270x or 370x. (See Table 2-30).

Prior to invocation, the 3174 must complete its IML sequence; that is, the operational microcode is in control and ready for I/O operations with the host.

Table 2-30. 3174 Models 1L, 1R, 2R, 11L, 11R, and 12R OLTs		
Configuration	**OLTs User's Guide**	**OLT**
3174 Model 1R and 11R, BSC operating with a 270x or a 370x with the Emulator Program (EP)	D99-3174B	R3174A
3174 Model 1R and 11R, BSC operating with a 270X, 370X EP, or a 370X NCP; R3174B requires that the 3700 Series Diagnostics be cataloged at the host. It is suggested that R3174A be used when operating with a 270X or 370X EP.	D99-3174-C D99-3700A	R3174B
3174 Models 1L, 1R, 2R, 11L, 11R, and 12R SDLC operating with a 370X NCP. Use the following link level tests:		
Link Level 1	D99-3700C	T3700LTE
Link Level 2	D99-3705A	T3705

Applicable Executive Control Program

These OLTs are compatible with the following control programs at the levels indicated or higher:

OLTSEP 9.0
DOS OLTEP 26
OS OLTEP 21.8
TCAM TOTE 10
OS/VS1 OLTEP 6
DOS/VS OLTEP 33
OS/VS2 SVS OLTEP 1.7
OS/VS2 MVS OLTEP 3.7

Chapter 3. Repair Information

Introduction

This chapter contains 3174 locations, card plug charts, an interrupt level chart, and removal/replacement procedures.

Locations

Figure 3-1 shows the physical locations of the components in the 3174 Establishment Controller.

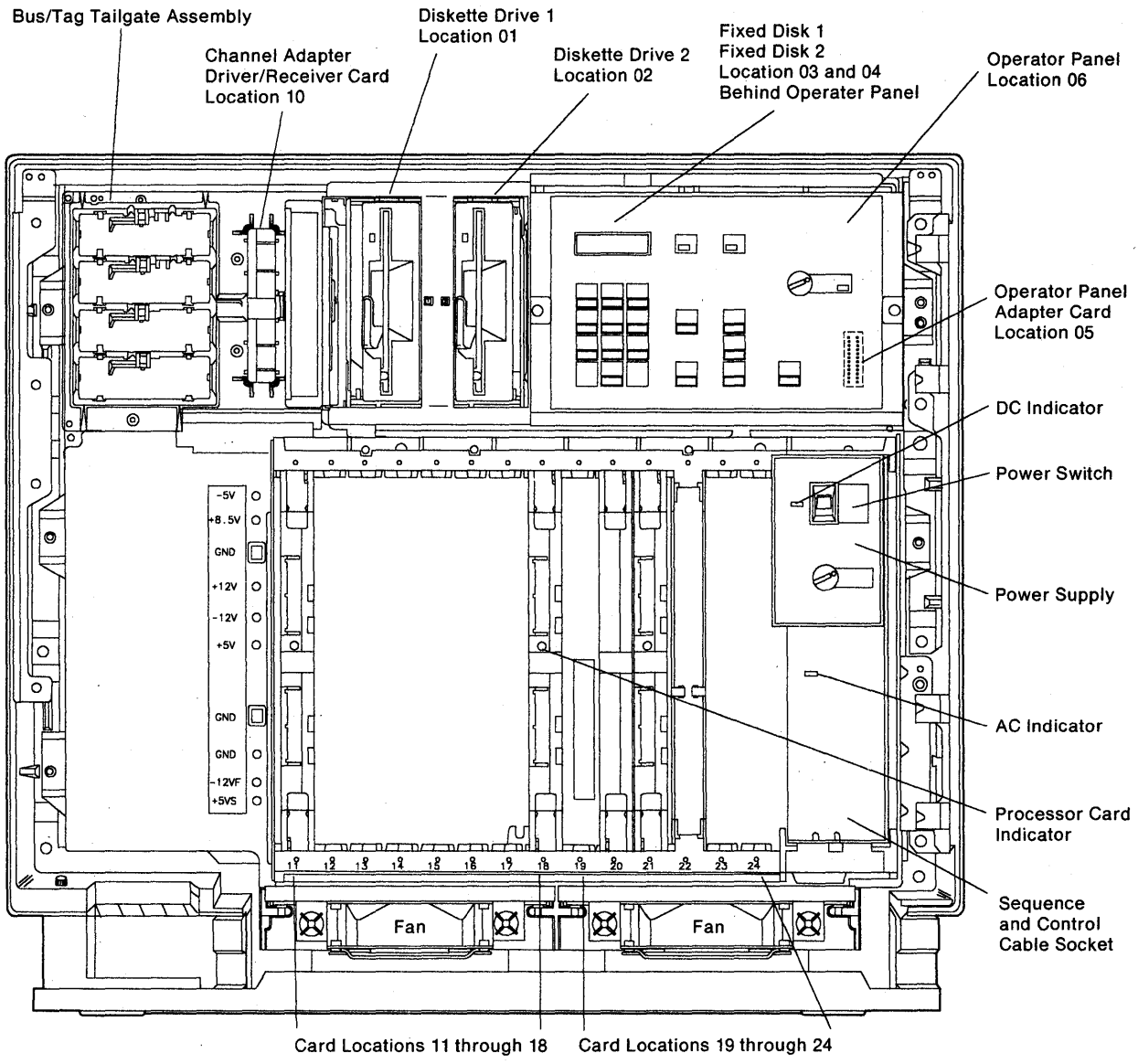


Figure 3-1. 3174 Locations

Card Plugging

The following paragraphs and tables show the card plugging for the 3174. The first table shows the card plugging using the card type number; the second table shows the card plugging by location. All features are shown but are not necessarily installed in your controller.

Important Notes about the Plug Charts:

1. In some controllers, the file adapter and terminal adapter are separate cards. The file adapter (type 9120) would be installed in location 21 and the terminal adapter (type 915X) would be installed in location 22 or 23.
2. The 933x cards (Asynchronous Emulation Adapters) listed in the table below are installed starting with location 14, then 13, then 12.
3. The 9263 and 9267 cards (Type 1 and Type 2 Concurrent Communication Adapters, respectively) are sensitive to their plugging order in the controller. Their plugging order depends on the way the controller was customized. The first or leftmost becomes hardware group 51, and the second becomes hardware group 52.
4. The plug charts below do not include the TMA cards. See "TMA Card Plugging" on page 3-5 for the TMA locations.

Table 3-1. Card Plugging by Card Type

Card Type	Model							
	1L	1R	2R	3R	11L	11R	12R	13R
9030		24	24	24				
9051	20	20	20	20				
	17	17	17	17				
9052	19	19	19	19	20	20	20	20
	20	20	20	20	17	17	17	17
	17	17	17	17				
9053	19	19	19	19	19	19	19	19
	20	20	20	20	20	20	20	20
	17	17	17	17	17	17	17	17
9154	21	21	21	21	21	21	21	21
9210	11				11			
9253	22	22		22	22	22		22
9263	12	12	12	12	15	15	15	15
	13	13	13	13	16	16	16	16
9267	12	12	12	12	15	15	15	15
	13	13	13	13	16	16	16	16
927x	22		22	22	22		22	22
933x	14	14	14	14	14	14	14	14
	13	13	13	13	13	13	13	13
	12	12	12	12	12	12	12	12
935x	12	11	11	11	12	11	11	11
	13				13			
	14				14			
	15				15			
	16				16			
					17			
950x	18	18	18	18	18	18	18	18

Table 3-2. Card Plugging by Location

Card Loc.	Model							
	1L	1R	2R	3R	11L	11R	12R	13R
11	9210	935x	935x	935x	9210	935x	935x	935x
12	9263 9267 933x 935x	9263 9267 933x	9263 9267 933x	9263 9267 933x	933x 935x	933x	933x	933x
13	9263 9267 933x 935x	9263 9267 933x	9263 9267 933x	9263 9267 933x	933x 935x	933x	933x	933x
14	933x 935x	933x	933x	933x	933x 935x	933x	933x	933x
15	935x				9263 9267 935x	9263 9267	9263 9267	9263 9267
16	935x				9263 9267 935x	9263 9267	9263 9267	9263 9267
17	905x	905x	905x	905x	905x 935x	905x	905x	905x
18	950x	950x	950x	950x	950x	950x	950x	950x
19	905x	905x	905x	905x	905x	905x	905x	905x
20	905x	905x	905x	905x	905x	905x	905x	905x
21	9154	9154	9154	9154	9154	9154	9154	9154
22	9253 927x	9253	927x	9253 927x	9253 927x	9253	927x	9253 927x
23								
24		9030	9030	9030				

TMA Card Plugging

Because of the many feature configurations, the TMA cards (Type 917X) have various locations in which they can be plugged. After all other base and feature cards have been installed, plug the TMA cards into the first available (open) locations, starting at the top of the following list:

Location 15
Location 16
Location 11
Location 23
Location 22
Location 12
Location 17
Location 24
Location 13.

For example, using the above list, if you have four TMA cards to install and you have feature cards already installed in locations 11, 22, and 12:

- TMA 1 would go in location 15.
- TMA 2 would go in location 16.
- Since location 11 already has a feature card, TMA 3 would go in location 23.
- Locations 22 and 12 have feature cards, so TMA 4 would go in location 17.

Storage Card Plugging

The storage cards for Models 11L, 11R, 12R, and 13R must be installed in the locations as shown in the following table. Any other combinations will cause status errors.

Table 3-3. Storage Card Plugging for Models 11L, 11R, 12R, and 13R.

Total Storage	Location		
	19	20	17
2MB	2MB		
3MB	2MB	1MB	
4MB	2MB	1MB	1MB
4MB	2MB	2MB	
5MB	2MB	1MB	2MB
6MB	2MB	2MB	2MB

Type and Hardware Group Numbers

Table 3-4. Type Numbers

Type	HG	FRU
0000		Invalid or Unknown
9000		Empty Card Location
9001		Invalid Card/Cond
9010	09	Operator Panel Adapter (Models 1L through 3R)
9011	09	Operator Panel Adapter (Models 11L through 13R)
9030	46	Encrypt/Decrypt Adapter
9051	87	512KB Storage Card
9052	87	1MB Storage Card
9053	87	2MB Storage Card
9110	01/02	Diskette Drive 1.2MB
9114	01/02	Diskette Drive 2.4MB
9120	01	File Adapter *
9132	03/04	Fixed Disk Drive
915X	26	Terminal Adapter *
9154	01/26	File/Terminal Adapter *
917X	26	Terminal Multiplexer Adapter
9210	16	Channel Adapter
9230	16	Channel Driver/Receiver
9253	11	Type 1 Communication Adapter (EIA/V.35)
9263	51/52	Type 1 Concurrent Communication Adapter (EIA/V.35)
9267	51/52	Type 2 Concurrent Communication Adapter (X.21)
927x	11	Type 2 Communication Adapter (X.21)
933x	21/22/23	Asynchronous Emulation Adapter
9350	31	Token-Ring adapter (4Mbps)
9351	31	Token-Ring adapter (16/4Mbps)
950x	87	Processor Card
9520	09	Operator Panel (Models 1L and 11L)
9521	09	Operator Panel (Models 1R, 2R, 3R, 11R, 12R, and 13R)
9540	21/22/23	AEA Cable Assembly

Interrupt Levels

Table 3-5 shows the card FRU type number, the physical location number, and the interrupt level that a particular card uses.

Table 3-5. Interrupt Level Chart

Card	Interrupt Level	Type	Loc
Processor	0	950X	18
Communication Adapter	1	9253 or 927X	22
Channel Adapter	1	9210	11
Token-Ring adapter	1	935X	11/12
File Adapter	2	9120	21
File/Terminal Adapter	2	9154	21
Terminal Adapter	2	915x	22/23
Asynchronous Emulation Adapter	3	933X	14,13,12
Concurrent Communication Adapter	1	926X	See note

Note: Locations 12 to 14 on Models 1L, 1R, 2R, and 3R 12 to 16 on Models 11L, 11R, 12R, and 13R

Microcode Level Support

The following chart is included to aid in determining what present microcode levels support.

Table 3-6. Features Supported by Microcode Support Level

Feature	A4.0	S4.0	A5.0	S5.0	B1.0
Min. Storage Required	1MB	1MB	2MB	2MB	2MB
Max Storage Supported by operational code	3MB	3MB	4MB	4MB	6MB
9051 512KB Storage card (see note 1)	YES	YES	NO	NO	NO
9052 1MB Storage card (see note 2)	YES	YES	YES	YES	YES
9053 2MB Storage card (see note 2)	YES	YES	YES	YES	YES
9120 File adapter	YES	YES	YES	YES	YES
9154 File adapter/Terminal adapter	YES	YES	YES	YES	YES
915X Terminal adapter	YES	YES	YES	YES	YES
917X TMA	YES	YES	YES	YES	YES
9210 Channel adapter	YES	YES	YES	YES	YES
925X Type 1 Communication Adapter	YES	YES	YES	YES	YES
926X Concurrent Communication Adapter	NO	NO	NO	NO	YES
927X Type 2 Communication Adapter	YES	YES	YES	YES	YES
933X Asynchronous Emulation Adapter	YES	YES	YES	YES	YES
9350 4MB Token-Ring	YES	YES	YES	YES	YES
9351 4/16MB Token-Ring	NO	NO	YES	YES	YES
Token-Ring Gateway Feature	NO	YES	NO	YES	YES
9500 Processor	YES	YES	YES	YES	YES
9501 Processor	NO	NO	YES	YES	YES
9110 1.2MB diskette	YES	YES	YES	YES	YES
9114 2.4MB diskette	NO	NO	YES	YES	YES
9132 Fixed disk	YES	YES	YES	YES	YES
3299 Models 1, 2, and 3	YES	YES	YES	YES	YES

Notes:

1. 512KB card is supported on the type 9500 processor. 512KB card will give errors on the type 9501 processor.
2. On Release A5.0/S5.0 and later, the configuration of the storage cards is restricted. See Table 3-3 on page 3-5.

Removal/Replacement Procedures

This section provides the information needed to remove and replace field replaceable units (FRUs): logic cards, power supply, diskette drives, fixed disks, bus/tag tailgate assembly, fans, and logic board.

Logic Card Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287. If the channel adapter card or the channel driver/receiver card has to be removed, see "How to Remove the Channel Adapter or Channel Driver/Receiver Card" on page 2-288.

Logic cards are held in place either by extractor levers or by thumbscrews. See the applicable procedure below for removing cards.

Cards with Extractor Levers

1. Place the power switch in the off position.
2. See Figure 3-2 on page 3-10. **If present, remove the shipping springs that secure the extractor levers by squeezing them together. These springs should be reinstalled if the machine is moved to another location.**
3. See Figure 3-3 on page 3-10. Unlock and rotate the extractor levers at the top and bottom of the card until the card disengages.
4. To replace the card, make sure that both extractor levers are in the open position (pointing out and away from the card).
5. Insert the card into the rail guide with the guide rib **A** to the right, and slide the card forward until the connectors meet. See Figure 3-2 on page 3-10.
6. Apply firm finger pressure at the top and bottom of the card to ensure that the card is seated.
7. Press firmly on both extractor levers simultaneously until they are latched. See Figure 3-3 on page 3-10.

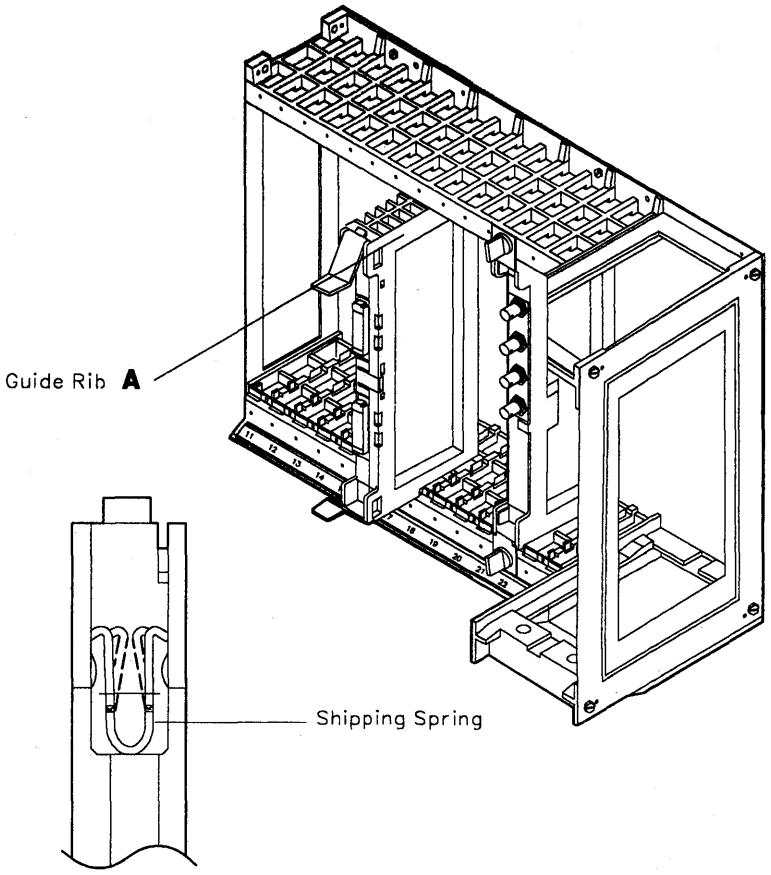


Figure 3-2. Card Removal/Replacement (Extractor Levers)

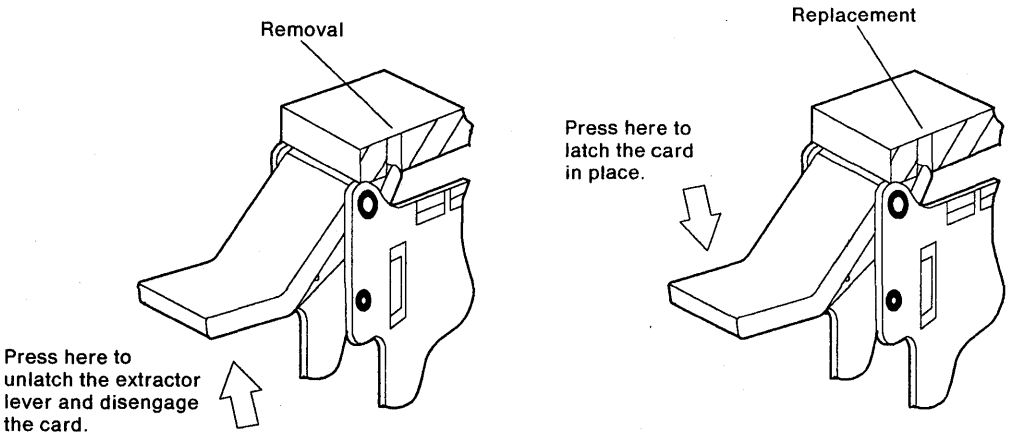


Figure 3-3. Card Removal/Replacement (Latching/Unlatching Extractor Levers)

Cards with Thumbscrews

1. Place the power switch in the off position.
2. See Figure 3-4 below. Turn the thumbscrews at the top and bottom of the card counterclockwise.
3. Pull the card forward to remove it from the logic board.
4. To replace, insert the card into the rail guide with the guide rib to the right and slide the card in until it bottoms. See Figure 3-4.
5. Turn the top and bottom thumbscrews clockwise at the same time until they are finger tight to ensure proper card seating and grounding.

   Note: If one thumbscrew is tightened first and then the other is tightened, the logic board pins can be damaged.

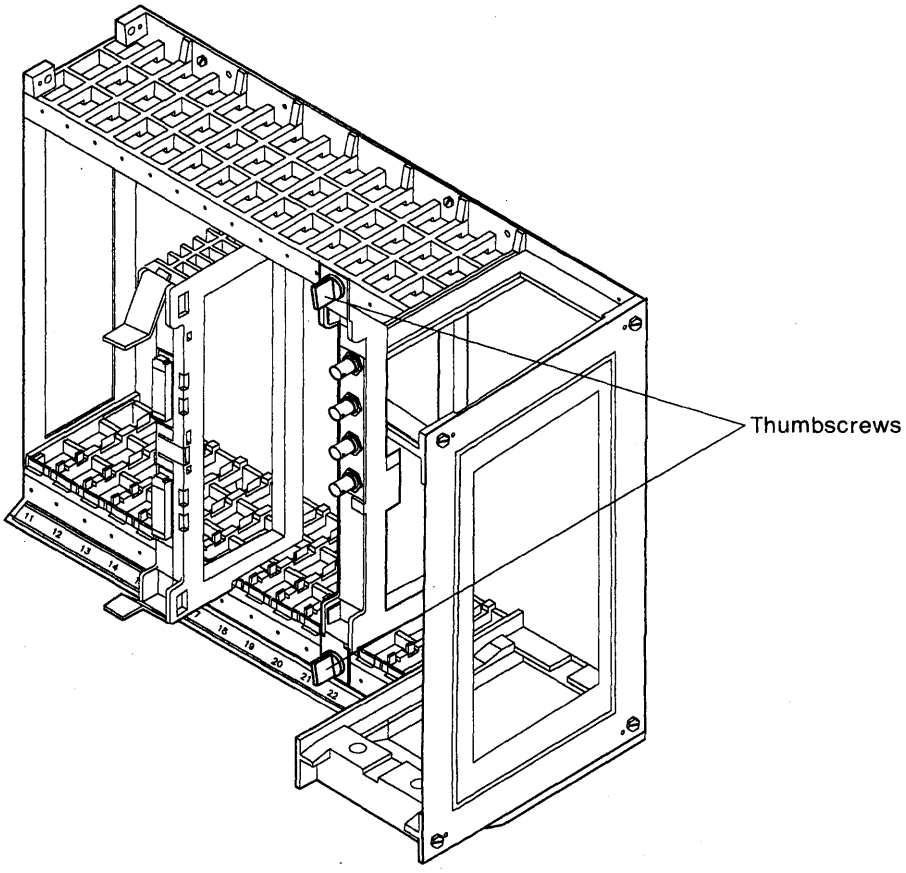


Figure 3-4. Card Removal/Replacement (Thumbscrews)

Asynchronous Emulation Adapter I/O Panel and Cable Removal/Replacement

1. Turn the two thumbscrews at the top of the I/O panel counterclockwise.
2. Swing the top of the I/O panel out from the controller, then lift it up to release it from the two slots in the bottom.
3. Remove the I/O panel (or blank panel) for HG 23 to gain access to the back of the logic board.
4. Disconnect the I/O panel cable connector for the panel you are removing from the back of the logic board.
5. Disconnect the ground wire.
6. Reverse the steps and actions to replace the I/O panel and cable.

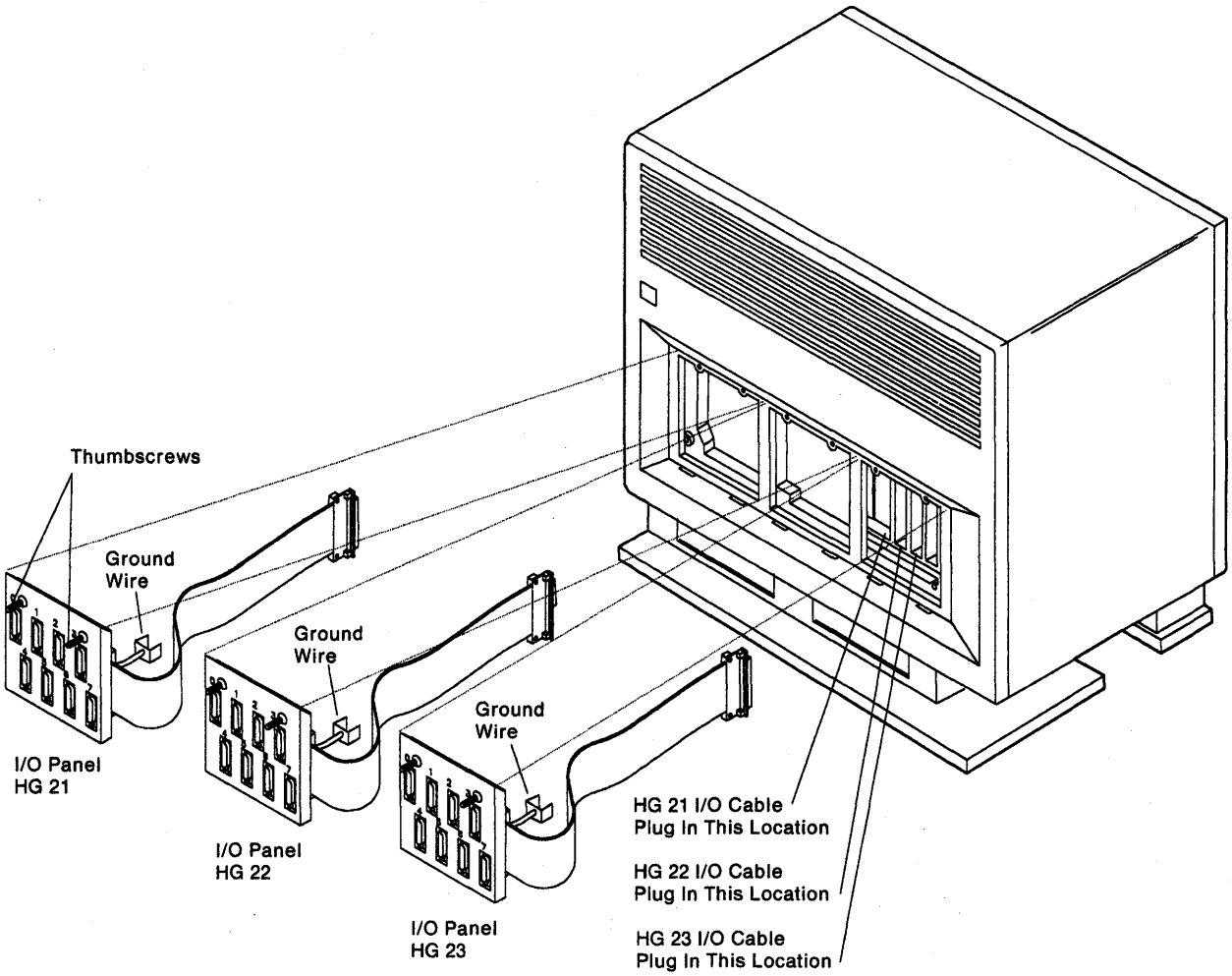


Figure 3-5. Asynchronous Emulation Adapter I/O Panel and Cable

Power Supply Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Place the power switch in the off position.
2. Remove the AC power cable at the power supply end. See Figure 3-6.
3. If present, remove the power control sequence cable.
4. Turn the two thumbscrews counterclockwise.
5. Pull the power supply forward to remove it.
6. Reverse the steps and the actions to replace the power supply.

   Note: In some countries the overlay on the power supply may have to be replaced.

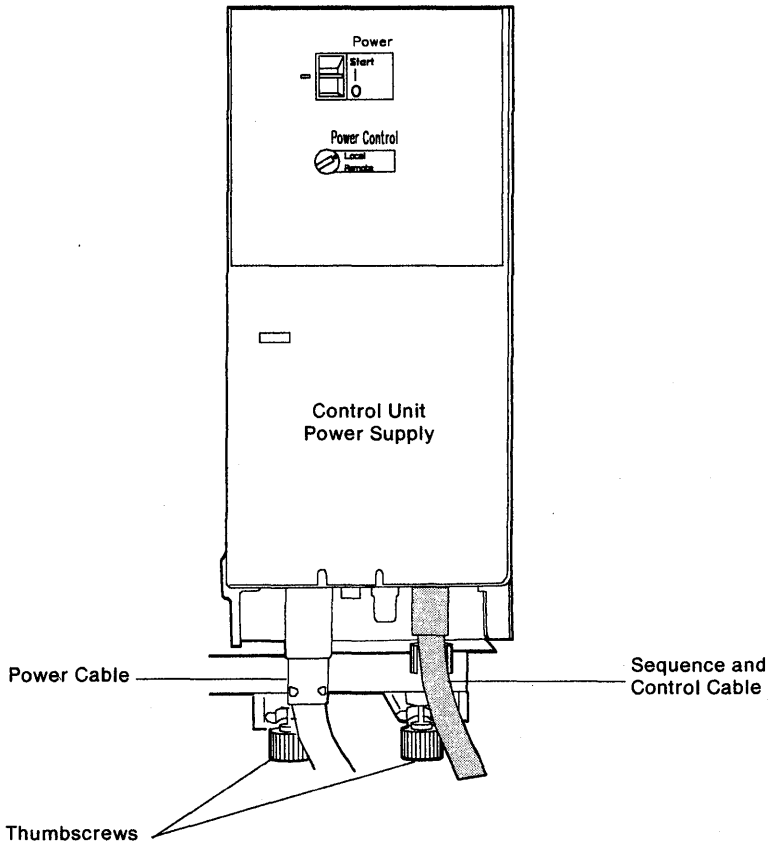


Figure 3-6. Power Supply Removal

Operator Panel Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Place the power switch in the off position.
2. Press both spring-loaded fasteners in and then release them. See Figure 3-7 below.
3. Pull the panel assembly forward to remove it.
4. Reverse the steps and the actions to replace the operator panel.

   Note: In some countries the operator panel overlay may have to be replaced.

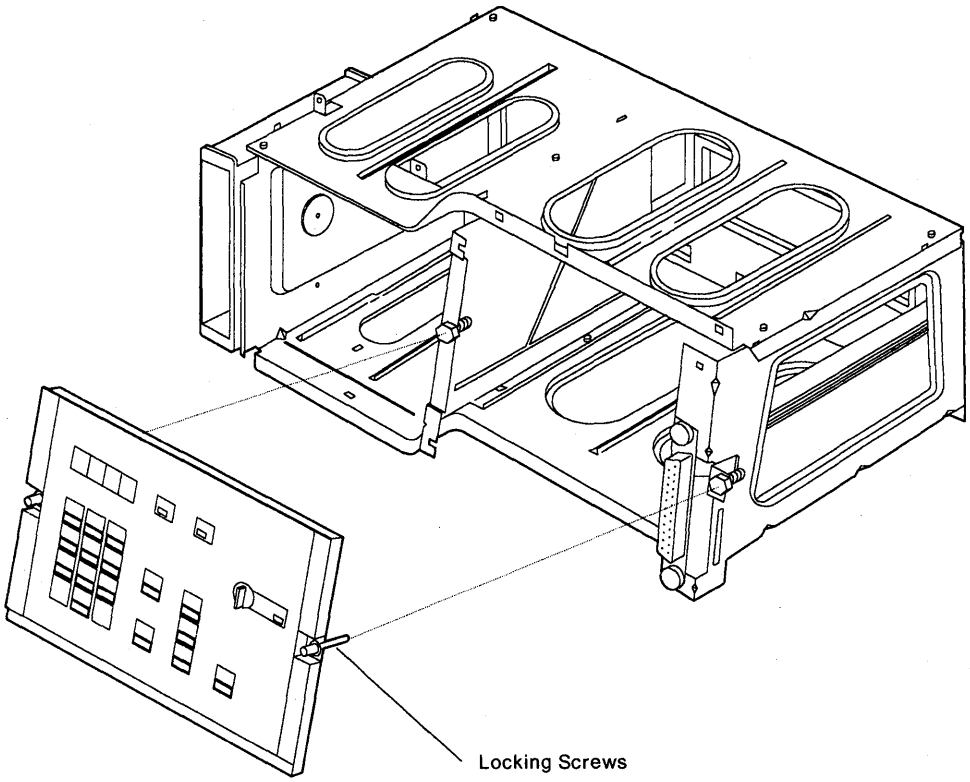


Figure 3-7. Operator Panel Removal

Operator Panel Adapter Card Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Place the power switch in the off position.
2. See Figure 3-7 on page 3-14.
   Press both spring-loaded fasteners in and then release them.
3. Pull the panel assembly forward to remove it.
4. Turn the two thumbscrews counterclockwise. See Figure 3-8.
5. Pull the card forward until it is unseated.
6. Reverse the steps and the actions to replace the card.

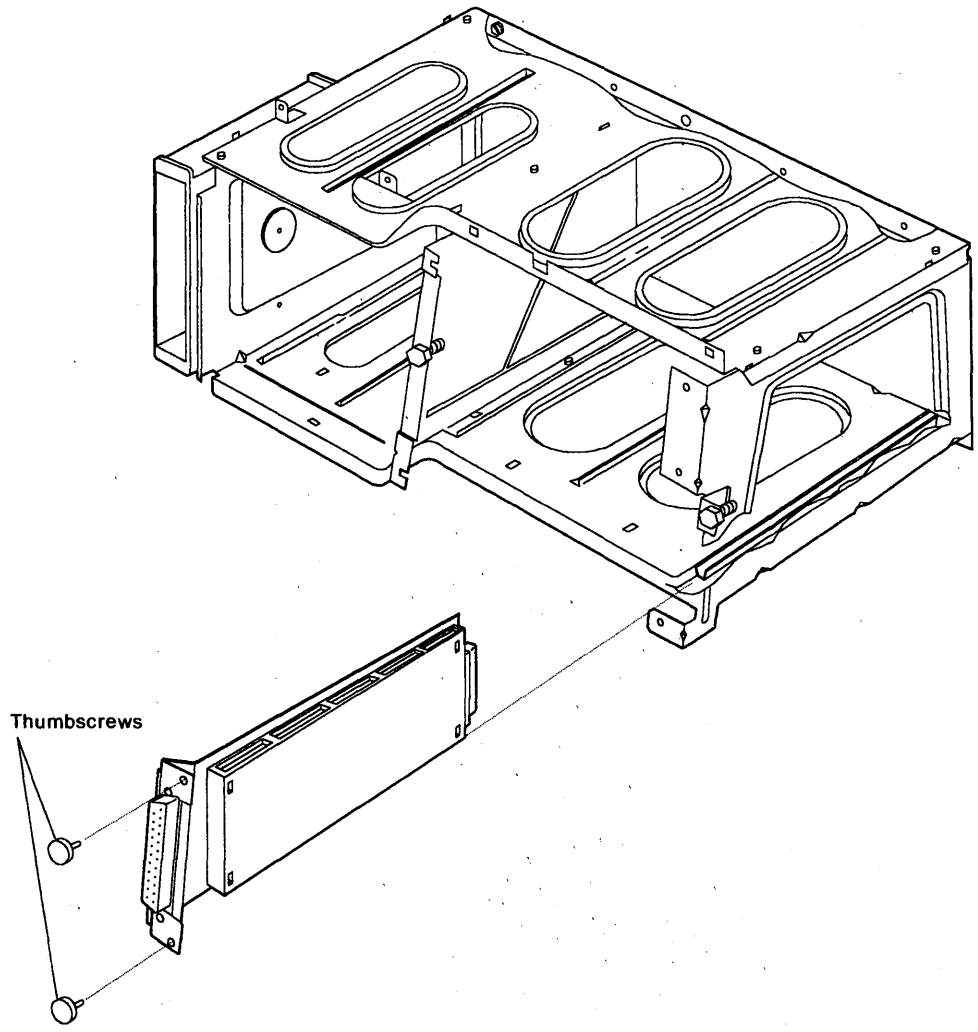
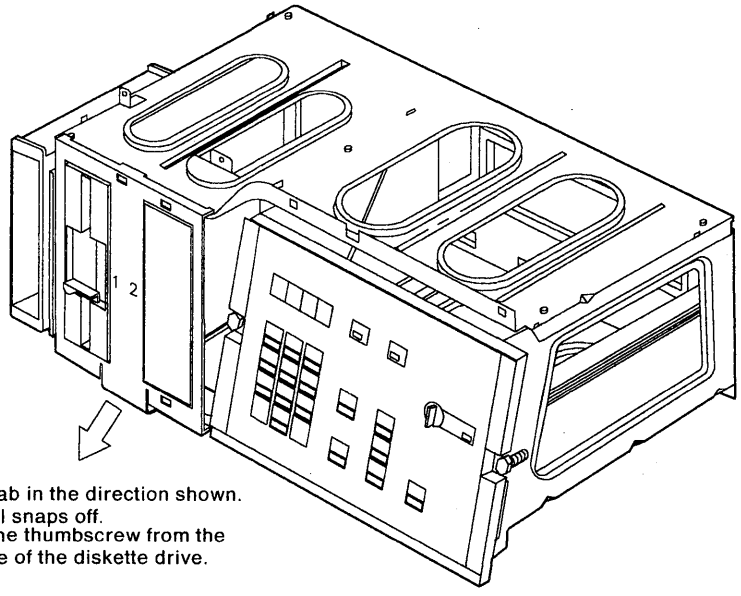


Figure 3-8. Operator Panel Adapter Card Removal

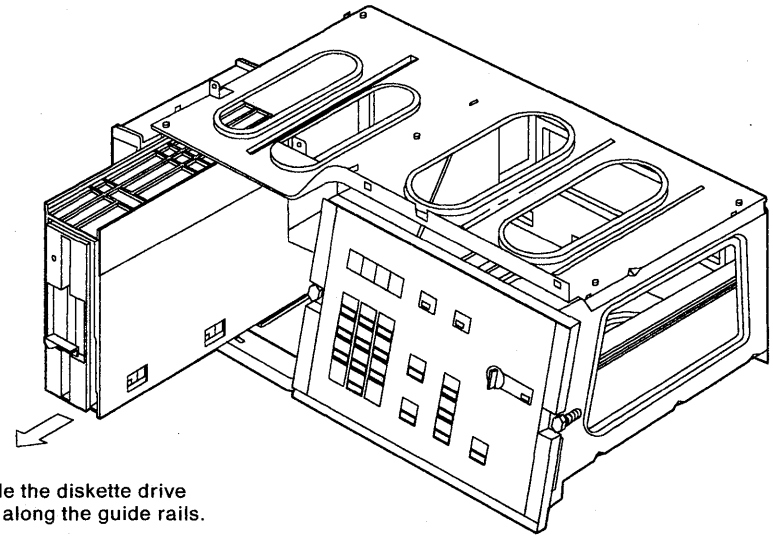
Diskette Drive Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Remove the diskette and insert the cardboard head protector.
2. Place the power switch in the off position.
3. See the following figures. Remove the bezel by pulling the tab down and forward.
4. Turn the captive thumbscrew counterclockwise until it drops down from the diskette drive.
5. Pull the diskette drive forward to remove it.
6. Reverse the steps and the actions to replace the diskette drive.



1. Pull the tab in the direction shown. The bezel snaps off.
2. Loosen the thumbscrew from the underside of the diskette drive.



Slide the diskette drive out along the guide rails.

Figure 3-9. Diskette Drive Removal

Fixed Disk Drive Removal/Replacement

Warning: The 3174 Models 1L and 11L (local attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. To prevent damage to the fixed disk and heads, if possible perform an Alt 2 IML from a diskette to park the heads.
2. Place the power switch in the off position.
3. Open the controller front door.
4. Press both spring-loaded fasteners on the operator panel in and then release them. See Figure 3-7 on page 3-14.
5. Pull the operator panel assembly forward to remove it.
6. Remove the thumbscrew under the first or second fixed disk. See Figure 3-10.

   Note: Notice which slot the fixed disk is in. If there is only one fixed disk, it must be in the leftmost slot.
7. Remove the fixed disk by pulling it straight out of the machine.
8. Reverse the steps and actions to replace the fixed disk and operator panel.
9. If the fixed disk is replaced, run "Fixed Disk Drive Full Format (FN 33)" on page 2-128.

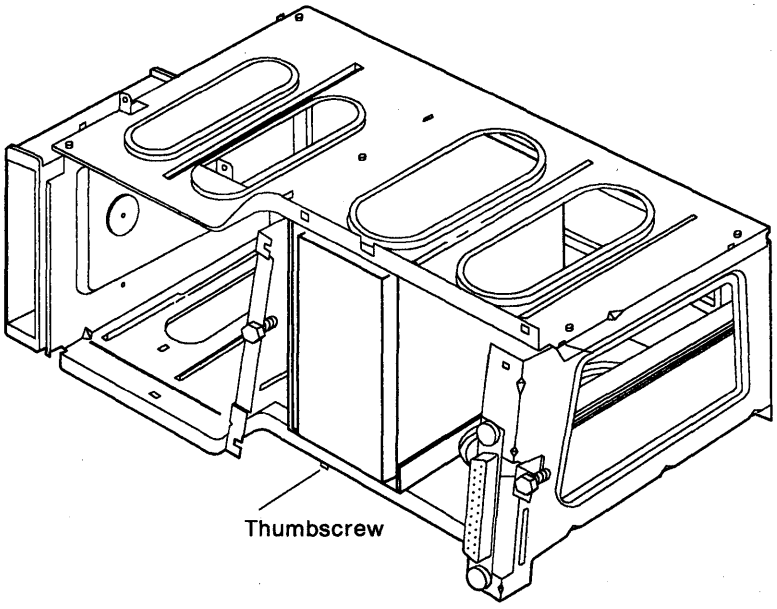


Figure 3-10. Fixed Disk Removal

Bus/Tag Tailgate Assembly Removal/Replacement (Models 1L and 11L)

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Place the power switch in the off position.
2. Record the priority switch settings.
3. See "How to Disconnect the Bus and Tag Cables" on page 2-288, then remove the channel interface cables. If present, remove the bus and tag terminator assemblies.
4. Unsnap the wire clip, and remove the channel adapter driver/receiver card.
5. Remove the diskette storage compartment. The holding screw is in the middle of the compartment. See Figure 3-12 on page 3-19.
6. See Figure 3-11. Remove the four slotted screws.
7. Lift the bus/tag tailgate assembly up, and tilt it toward you until it is disconnected from the logic board.
8. Reverse the steps and the actions to replace the tailgate assembly.
9. Ensure the priority switches are set correctly.

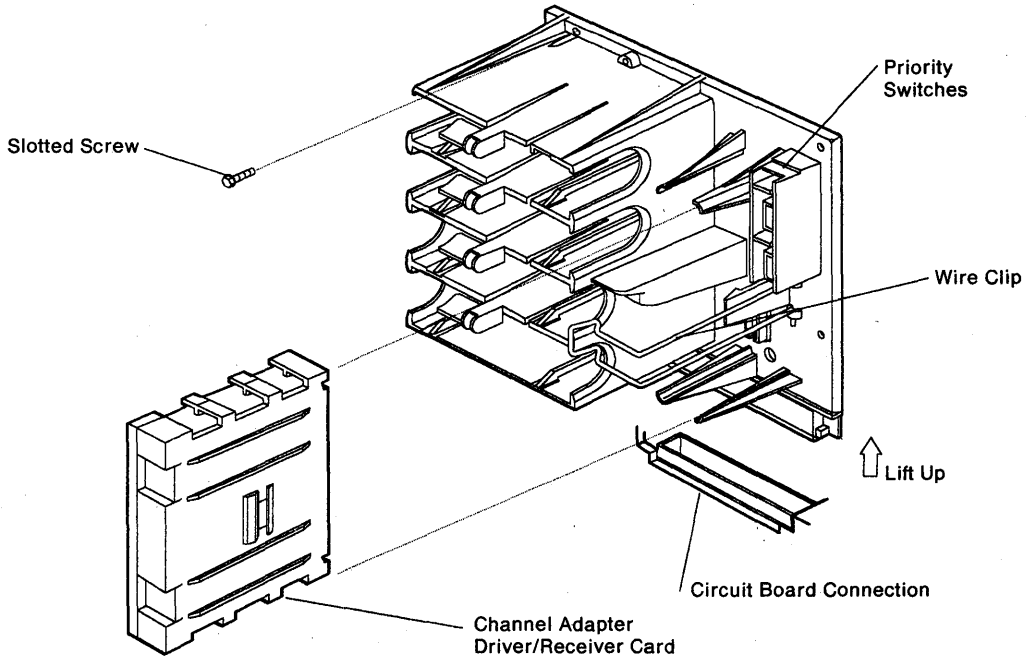


Figure 3-11. Tailgate Assembly Removal

Fan Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Place the power switch in the off position.
2. See Figure 3-12. If the shipping bracket is present, remove it.
3. Disconnect the EMC ground pigtail.
4. The fan is secured either with thumbscrews or with a metal retainer. Loosen the two thumbscrews or press down and hold the metal retainer.
5. Pull the fan assembly forward to remove it.
6. Reverse the steps and the actions to replace the fan.

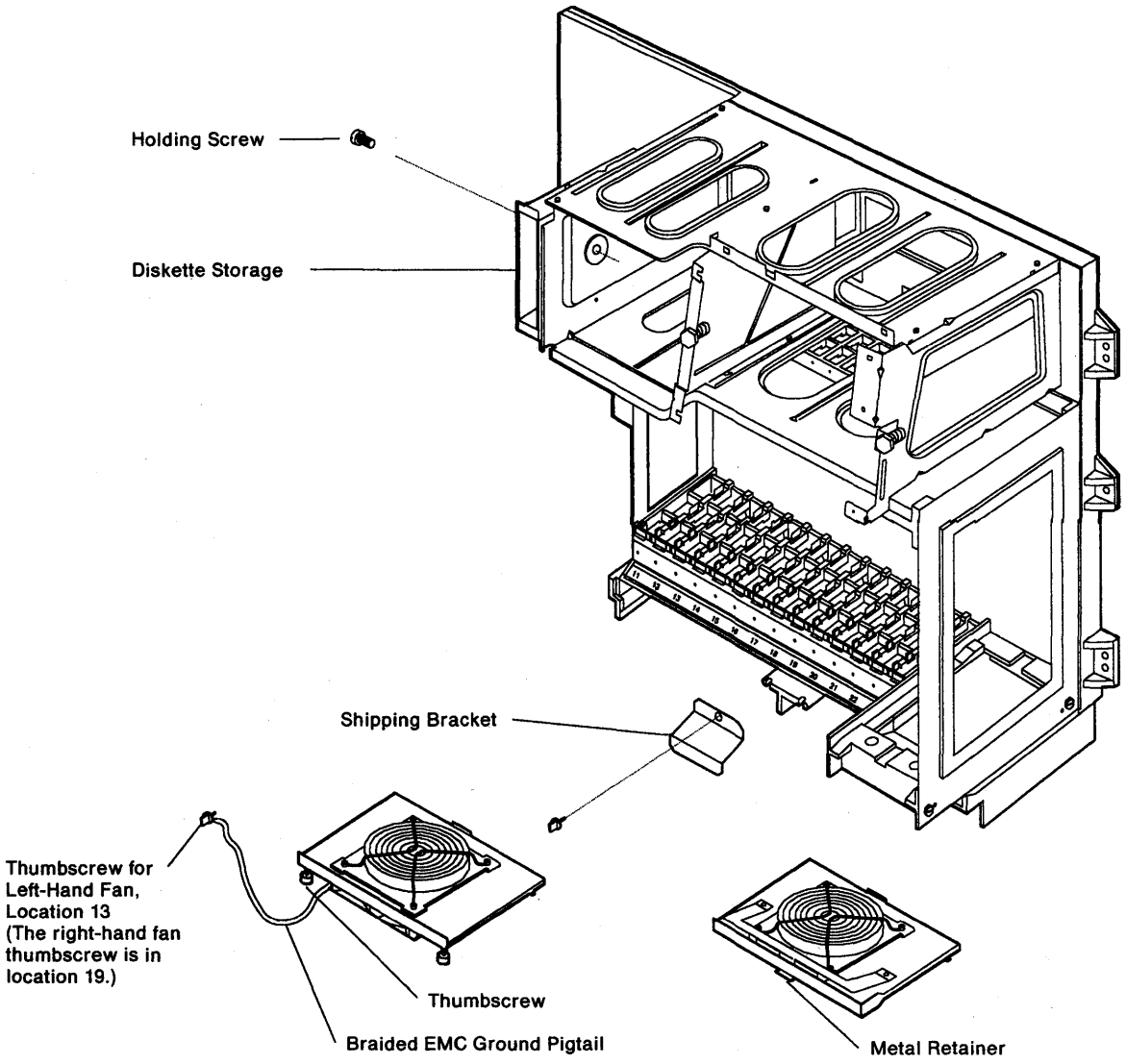


Figure 3-12. Fan Removal

Logic Board Removal/Replacement

Warning: The 3174 Models 1L and 11L (local-attached) must be offline from the host channel before you perform this procedure. See "How to Take the 3174 Offline (Models 1L and 11L Only)" on page 2-287.

1. Switch power off and disconnect the power plug from the outlet.
2. Remove the front door by removing the two hinge pins.
3. For Models 1L and 11L only, remove the bus/tag cables. See "How to Disconnect the Bus and Tag Cables" on page 2-288.
4. Label and disconnect all interface cables and device signal cables.
5. Remove the operator panel. See "Operator Panel Removal/Replacement" on page 3-14.
6. Remove the operator panel adapter card. See "Operator Panel Adapter Card Removal/Replacement" on page 3-15.
7. Remove the diskette drive(s). See "Diskette Drive Removal/Replacement" on page 3-16.
8. Remove all logic cards. It is important to label the location of the logic cards prior to removal. See "Logic Card Removal/Replacement" on page 3-9.
9. Remove the power supply. See "Power Supply Removal/Replacement" on page 3-13.
10. Remove the two fan assemblies. See "Fan Removal/Replacement" on page 3-19.
11. Remove the five screws that secure the bracket and hinge that mounts to the right side of the logic card housing. See Figure 3-13 on page 3-21.
12. Remove the screw that secures the logic board EMC ground strap to the base of the machine.
13. Remove the four screws that secure the operator panel housing to the top of the cabinet.
14. Remove the six hex screws that mount the logic board assembly to the cabinet (three on each side).
15. Remove the logic board assembly from the machine.
16. For Models 1L and 11L only. Remove the bus/tag tailgate assembly. See "Bus/Tag Tailgate Assembly Removal/Replacement (Models 1L and 11L)" on page 3-18.
17. Remove the nuts, lockwashers, and flatwashers from the two alignment pins at the top of the logic card housing. Keep these parts for later use.
18. Remove the four screws from the top and the four screws from the bottom of the logic card housing.

    Note: On early-production machines, the bottom of the card housing may be attached with one screw and three bolts that are secured by nuts at the back of the board assembly. If these are present, discard the parts and use the four machine screws (P/N 1621366) and washers (P/N 1622318) shipped with the replacement board assembly.
19. Remove the two flat washers from the alignment pins and save for later use. These flat washers are installed between the logic card housing and the operator panel housing.
20. Remove the four screws from the top and the four screws from the bottom of the operator panel housing. See Figure 3-13 on page 3-21.

    Note: The mounting screws for the operator panel housing are shorter than the mounting screws for the logic card housing. Do not interchange these screws or the logic board will be damaged.

21. Reverse the steps and the actions to replace the board assembly. See notes A and B.

Notes:

a. When reversing step 20, install diskette drive 1 and the operator panel adapter card before final tightening of the eight mounting screws. Adjust the housing so that the diskette drive sits flat on the housing mounting surface.

b. When reversing step 18, install logic cards in positions 11 and 24 before final tightening of the eight mounting screws. This ensures that the logic cards align and seat correctly.

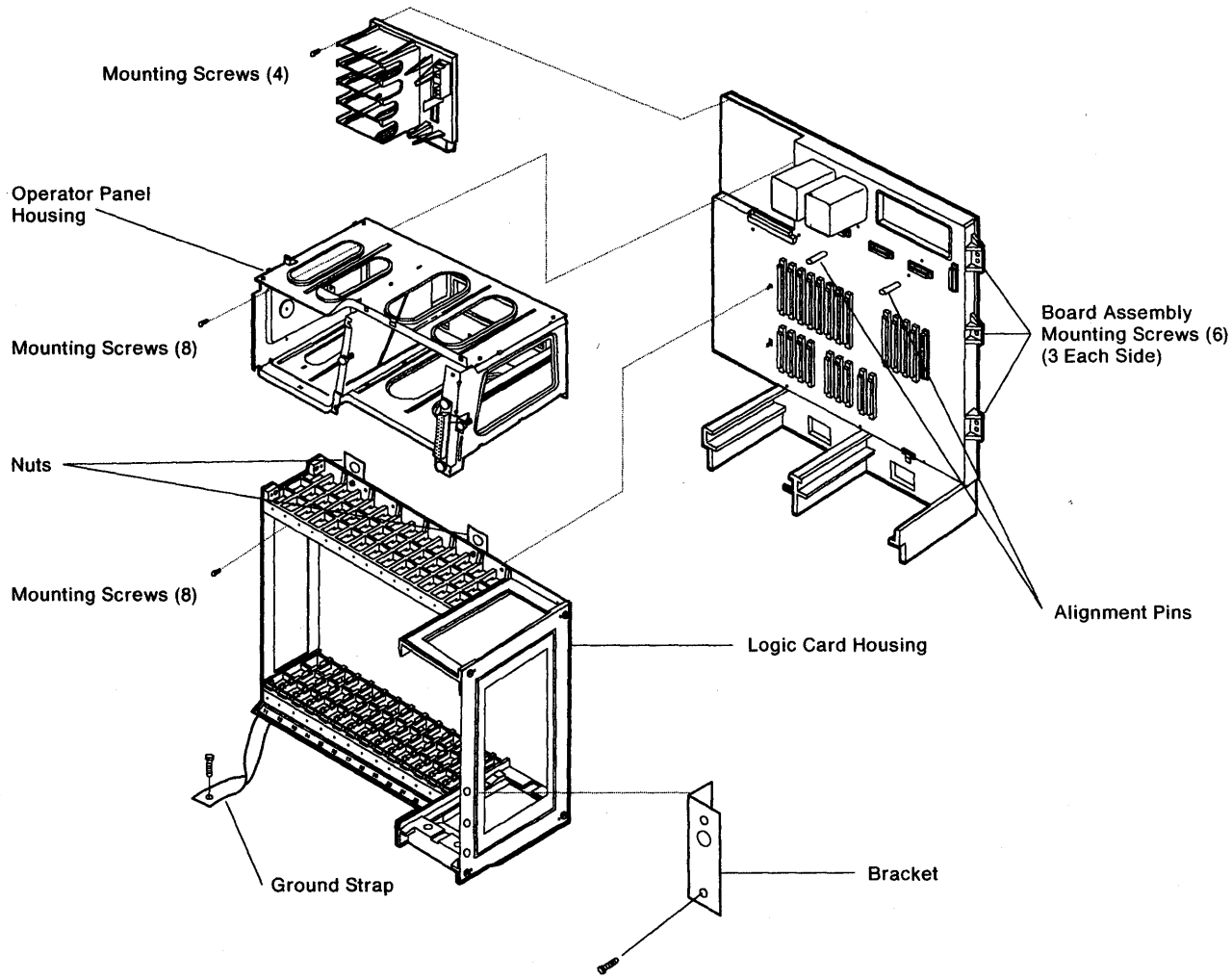


Figure 3-13. Logic Board Removal

Chapter 4. Installation

Introduction

This chapter contains the information needed to complete the installation of 3174 Establishment Controller Models 1L and 11L. Customer setup and configuration should be done by the customer before you perform the installation procedure. If you are not familiar with attaching controllers to a channel, review the section "Channel Attachment Information" on page 4-11.

Installation Procedure

Installing a 3174 requires setting the priority switches, connecting the channel interface cables, and connecting the power control and sequence cable if one is present.

1. Set the priority switches. See "Priority Switches."
2. Connect the channel interface cables. See "Connecting Bus/Tag Channel Cables" on page 4-5.
3. If required, connect the power control and sequence cable. See "Connecting the Power Control and Sequence Cable" on page 4-10.
4. Check the UCW settings. See "UCW Settings" on page 4-3.

Note: It is recommended that the channel driver/receiver wrap test be performed before you connect the controller to the host channel. To perform this test, you need a set of channel wrap blocks (P/N 56X4829 and 6246339). These wrap blocks are obtained through normal parts distribution. The wrap blocks are normally installed in the 3174 tailgate. They can also be connected to the ends of the Bus In and Tag In channel cables to verify that the cables are working correctly. See "How to Run the Channel Driver/Receiver Wrap Test (FN 01)" on page 2-140.

Priority Switches

The 3174 comes from the factory with the priority switches set to *high priority*. To verify or change the switch settings, see Table 4-1 and Figure 4-1 on page 4-3.

Table 4-1. Priority Switch Settings

Switch	High	Low	Bypass	Illegal
Upper	Up	Down	Down	Up
Lower	Up	Down	Up	Down

The switch settings are described below:

High: This serial passing of the incoming selection signal ('select out') enables the 3174 to be logically connected to the channel before low-priority controllers.
Low: This serial passing of the outgoing signal ('select in') enables the 3174 to be logically connected to the channel after high-priority controllers.
Bypass: The selection signal is not allowed to logically select the 3174. This is used when the channel adapter or channel driver/receiver cards are removed.
Illegal: Do not use this setting. Host problems will occur.

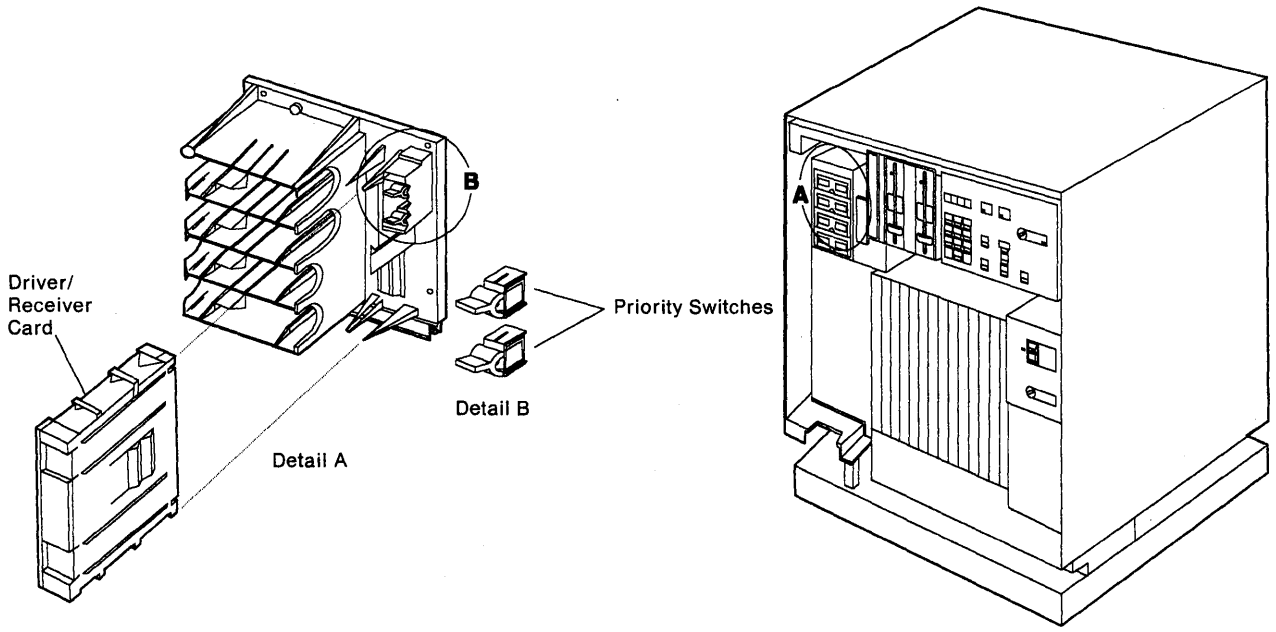


Figure 4-1. Priority Switches

Controller Channel Priority

Controller priorities on the channel interface are determined by the order of attachment to the channel tag signals 'select out' and 'select in.' These signals form a loop from the channel through each controller and back. Setting the switches to "high priority" attaches the controller selection circuitry to 'Select Out.' Setting the switches to "low priority" attaches the controller selection circuitry to 'Select In.' Setting the switches to "bypass" disconnects the controller selection circuitry from the channel. If the 3174 is used to drive a host system console, it is recommended that the controller be given the highest priority on the channel. Consult the account systems engineer if you are in doubt about the proper setting of the switches for your particular channel configuration.

UCW Settings

The recommended UCW settings for shared or nonshared mode of operation are as follows:

- Shared = Yes (Configuration question 101 = 4)
- Shared = No (Configuration question 101 = 5).

See Table 4-2 on page 4-4 or Table 4-3 on page 4-4 to select the proper UCW setting that applies to the host system and 370 mode being used.

Table 4-2. UCW Settings (370 Mode)

Controller	Channel	UCW Setting
3174 1L and 11L SNA (Single Address)	Byte or Block	Nonshared
3174 1L and 11L Non-SNA(Multiple Address)	Byte or Block	Shared
3174 1L and 11L with Token-Ring Gateway Feature	Byte or Block	Shared

Table 4-3. UCW Settings (370 XA Mode)

Controller	Channel	UCW Setting
3174 1L and 11L SNA (Single Address)	Byte or Block	Nonshared IOCP (Shared = N)
3174 1L and 11L Non-SNA(Multiple Address)	Byte Block	Shared (IOCP = N) Shared (IOCP = YB)
3174 1L and 11L with Token-Ring Gateway Feature	Byte Block	Nonshared (IOCP = N) Shared (IOCP = YB)

Connecting Bus/Tag Channel Cables

To allow easier access to the area of the controller where the bus and tag cables are routed, a swing gate has been provided. See Figure 4-2. Remove the thumbscrew and pull the swing gate out. For the location of the bus/tag tailgate assembly, see Figure 4-3 on page 4-6.

Note: When a 3174 is being installed on a raised floor, place the left side of the controller to the right of the cutout in the floor. This provides easier access to route the bus and tag channel cables through the controller cable access area.

Depending on the channel configuration, use one of the following figures to connect the bus/tag channel cables:

- Figure 4-4 on page 4-7 for installing a 3174 on end-of-channel
- Figure 4-5 on page 4-8 for replacing an existing 3274
- Figure 4-6 on page 4-9 for installing a 3174 on other than end-of-channel.

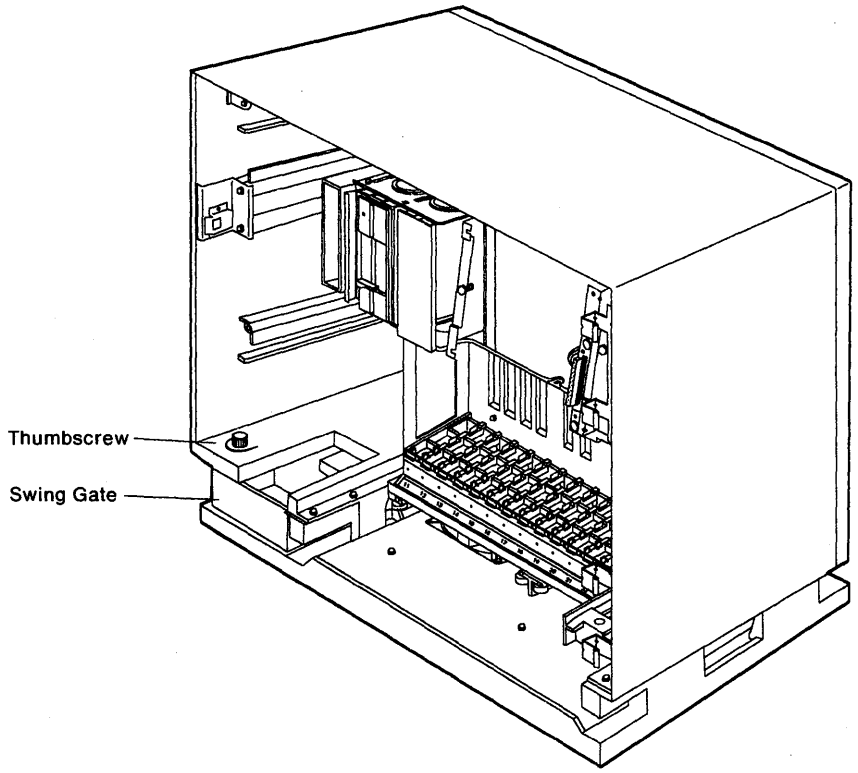


Figure 4-2. Channel Cable Access Area

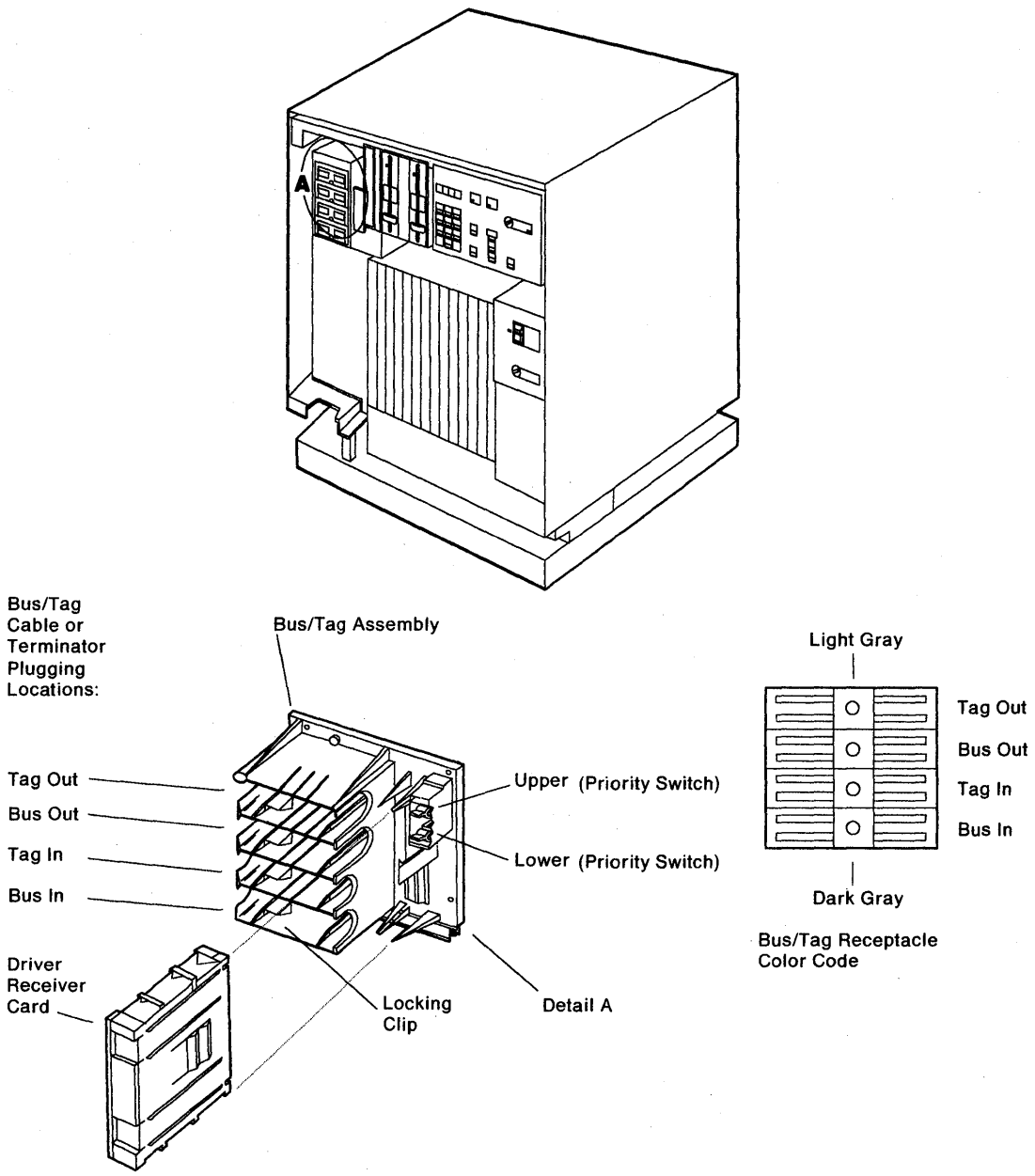
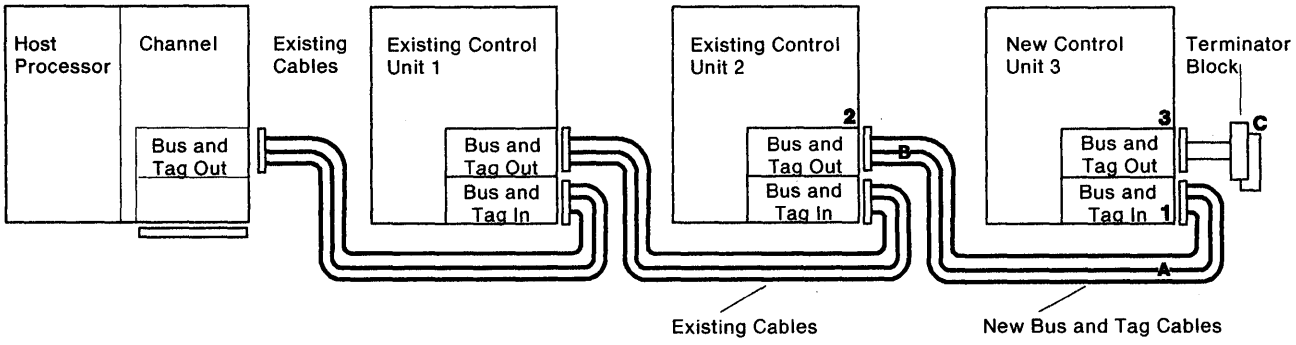


Figure 4-3. Bus/Tag Tailgate Assembly



Note: The same cable connector colors should never be connected together. For example: the light-gray cable ends go to the dark-gray receptacles in the control unit; the dark-gray cable ends go to the light-gray receptacles in the control unit.

Figure 4-4. Adding a 3174 on End-of-Channel

Warning: Ensure that the processor/channel state will permit removal of the block with no adverse effect before you remove any terminator block from an existing controller.

See Figure 4-3 on page 4-6 for Bus/Tag I/O tailgate locations.

1. Connect *new* Bus and Tag cable ends **A** to 3174 Bus and Tag In receptacles **1**
2. Remove terminator blocks **C** from existing controller Bus and Tag out receptacles **2** if installed.
3. Connect new Bus and Tag cable ends **B** to existing controller Bus and Tag Out receptacles **2**.
4. Connect terminator blocks **C** to 3174 Bus and Tag Out receptacles **3**.

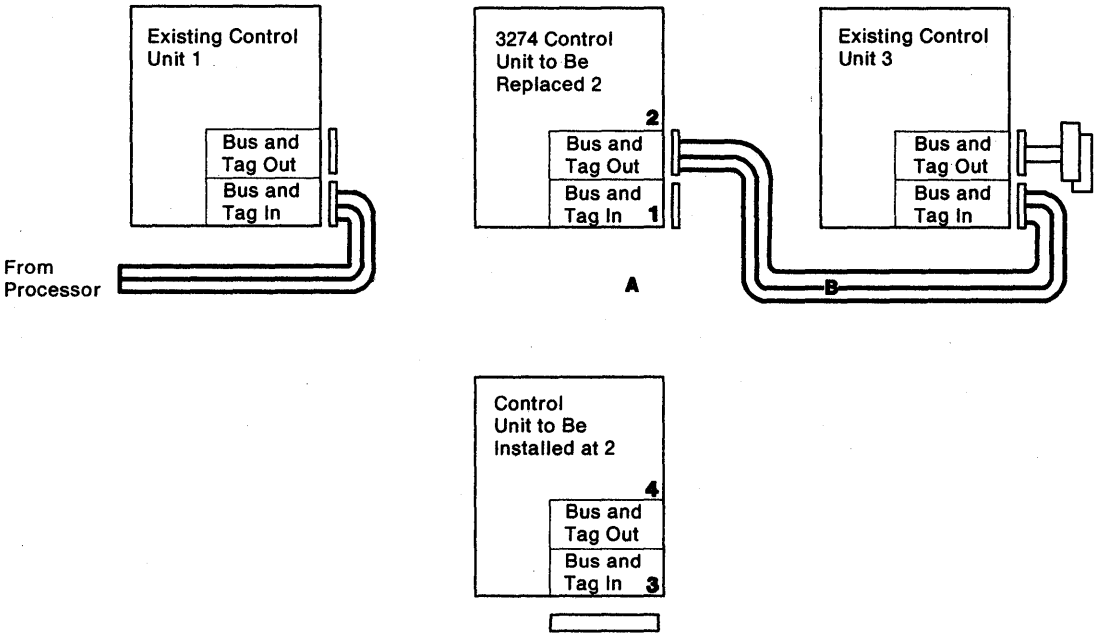


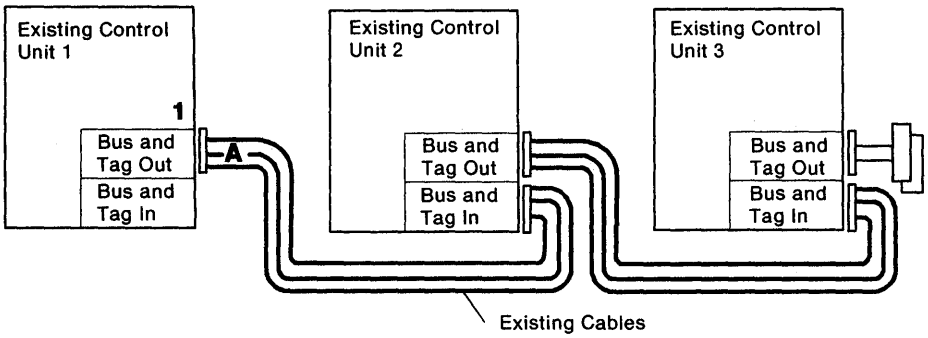
Figure 4-5. Replacing an Existing 3274 on a Channel Interface

Warning: Ensure that the processor/channel state will permit removal of the cables before you remove any Bus and Tag cables from an existing controller.

See Figure 4-3 on page 4-6 for Bus/Tag I/O tailgate locations.

1. Remove existing Bus and Tag cable ends **A** from 3274 Bus and Tag In receptacles **1**.
2. Remove existing Bus and Tag cable ends **B** from 3274 Bus and tag Out receptacles **2**.
3. Move the 3274 away from the opening in the raised floor, and position the 3174 near enough to the opening to connect the cables in the following steps.
4. Connect existing Bus and Tag cable ends **A** to the 3174 Bus and Tag In receptacles **3**.
5. Connect existing Bus and Tag cable ends **B** to the 3174 Bus and Tag Out receptacles **4**.

Note: Bus and Tag Out and Bus and Tag In receptacles may vary from controller to controller.



Note: Bus and Tag Out and Bus and Tag In receptacle locations may vary from control unit to control unit.

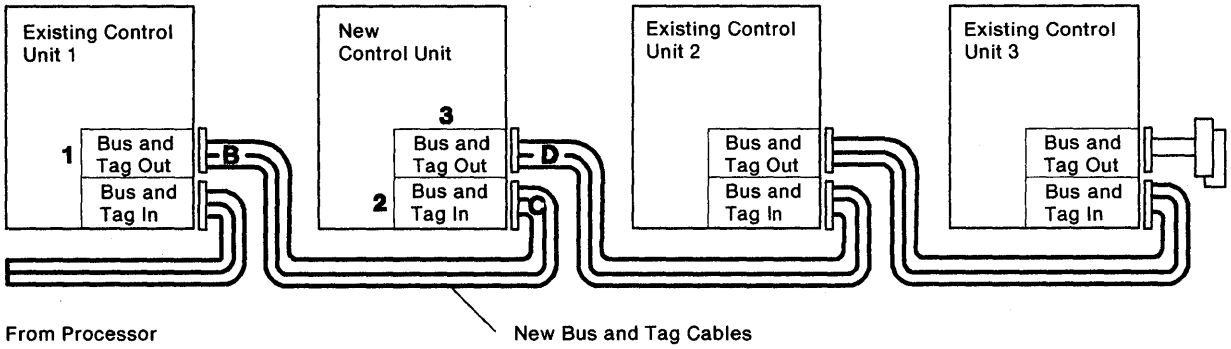


Figure 4-6. Adding a 3174 not on the End-of-Channel

Warning: Ensure that the processor/channel state will permit removal of the cables before you remove any Bus and Tag cables from an existing controller.

See Figure 4-3 on page 4-6 for Bus/Tag I/O tailgate locations.

1. Remove existing Bus and Tag cable ends **A** from existing controller 1 Bus and Tag Out receptacles **1**.
2. Connect *new* Bus and Tag cable ends **B** to existing controller 1 Bus and Tag Out receptacles **1**.
3. Connect *new* Bus and Tag cable ends **C** to 3174 Bus and Tag In receptacles **2**.
4. Connect existing Bus and Tag cable ends **D** to 3174 Bus and Tag Out receptacles **3**.

Connecting the Power Control and Sequence Cable

The power control and sequence cable plugs into the bottom of the power supply adjacent to the power cord plug. See Figure 4-7.

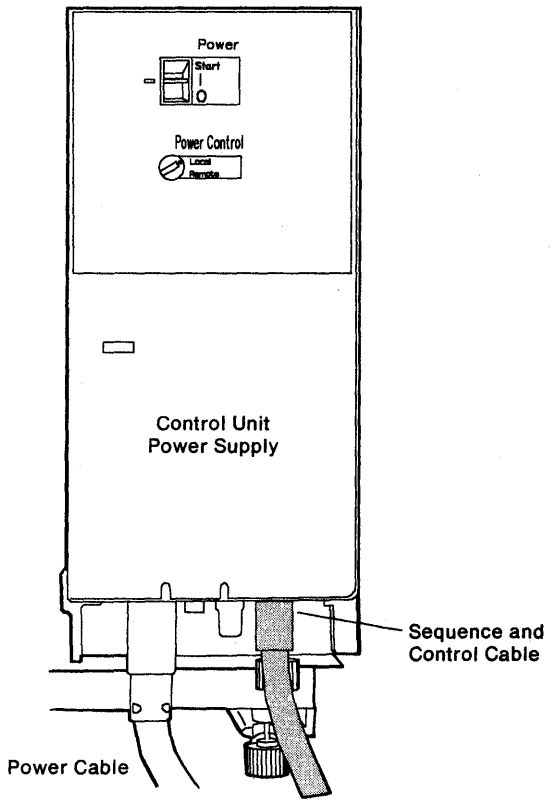


Figure 4-7. Power Sequence and Control Cable

Channel Attachment Information

Table 4-4 is a matrix of the customizing parameters and host systems for which the 3174 Models 1L and 11L are supported. The customizing parameters are described in Chapter 3 of the *3174 Customizing Guide*, GA23-0214. The matrix applies to SNA and non-SNA attachments.

Table 4-4. Host-Channel Customizing Parameters

Host System and Channel Type	Controller Address Question 104	Upper Limit Address Question 105	Command Retry Question 222	Mode of Data Transfer Question 224	Channel Burst Size Question 225
4341 Byte Multiplexer	Note 1	Note 1	Yes. Note 2	High-Speed Transfer Note 3	32 4
4341 Block Multiplexer	Note 1	Note 1	Yes Note 2	High Speed Transfer Note 3	NA Note 4
4361 Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
4361 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
4381 Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
4381 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
308X Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
308X Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
3090 Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
3090 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
9370 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4

Notes:

1. ***Controller Address***
   In SNA mode (configuration question number 101 = 5), a single address is specified during configuration. The individual device addresses are contained in the SNA data stream.

   In non-SNA mode (configuration question number 101 = 4), multiple addresses are assigned in a contiguous range, to a maximum of 32. If a device address is configured but no device is physically connected to the 3174 port, then the 3174 microcode identifies to the channel adapter card that the device is unavailable. If the channel attempts an operation to the unavailable device, the controller returns unit-check status and intervention-required sense.

2. ***Command Retry***
   If command retry is enabled, the 3174 initiates a retry request for all Bus Out parity checks detected during write data transfer sequences.

3. ***Data Transfer Modes***
   The channel adapter in the 3174 can transfer data in two different modes:

   - Data Chained Interlocked (DCI)
   - High-Speed Transfer (HST).

No requirements exist for special channel cabling, plugging, or physical installation setup as a result of choosing one data transfer mode over another.

- DCI – Interlocked single tag
- HST – Interlocked double tag

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

4. ***Channel Burst Size***
   The 3174 transfers data in an interlocked mode at a rate of 1.25 megabytes, or 0.8 microsecond per byte. The channel burst size default value for the 3174 is 32. The consequences of specifying larger burst sizes can be determined only by calculating the critical wait times of other control units and devices attached to the same byte multiplexer channel. Exceeding the wait times of the other devices may cause them to overrun and/or otherwise degrade their performance. Consult with the account systems engineer if you suspect the burst size is not set correctly.

   The burst size selected for operation on a block multiplexer channel does not affect the data transfer rate because a block channel forces burst mode.

Chapter 5. Safety Inspection Guide

Introduction

This chapter is a guide to inspecting 3174 Establishment Controller Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R for potentially unsafe conditions. It provides a list of preparatory items, a checklist of inspection items, and an illustration of safety labels.

Preparation

- Completion of *Electrical Safety Training Course for IBM Customer Engineers* is required (Self-Study Course 77170, or FIS II Course 70702, or the current level of each).
- Machine power should be off and electrical power removed from the machine before you begin the checklist.
- The following should be available for reference:
  - Copies of CEMs (ECAs and SAs) for this machine type
  - *3174 Site Planning*, GA23-0213
  - *Electrical Safety for IBM Customer Engineers*, S229-8124.

Note: Although completeness and accuracy are the goals of this guide, not all machine configurations (for example, special features, RPQs) are covered. If you encounter a machine with RPQs or features not described in this guide, use the installation instructions for the RPQ or feature for additional information. Otherwise, use this guide and good judgment to obtain a safe machine.

General Checklist Guidelines

The intent of this inspection guide is to help you identify potentially unsafe conditions on machines being inspected. Each machine, at the time of its manufacture, had required safety items installed to protect the owners/operators and service personnel from injury. This checklist covers only those items. Good judgment should be used to identify potential safety conditions not covered by this inspection guide.

Complete the following checklist before bringing power up on the machine. If any apparent unsafe conditions are present, a determination must be made on how serious the hazard could be and whether to continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical, especially primary power – for example, a frame where electrical potential is above ground potential can cause serious or fatal electrical shock.
- Explosive – for example, a damaged CRT face or bulging capacitors can result in serious injury.
- Use of chemicals, cleaning solutions, or solvents other than those specified by IBM.

Checklist

Checks

- ☐ Check that machine power is off and the mainline power cord is disconnected before you start this procedure.
- ☐ Check that the front cover hinge pins are installed securely.
- ☐ Check that the power cord is not frayed or damaged.
- ☐ Check that the power cord strain relief is tight. Locate the power cord entry under the power supply. See Figure 5-1 on page 5-4.

Inside the machine

- ☐ Check for any non-IBM alterations. If there are any, has "R009, Non-IBM Alteration/Attachment Survey" been completed?
- ☐ Check for broken or loose parts or assemblies.

Check all retaining screws, such as:

- ☐ Those that secure the logic board to the frame housing. See Figure 5-1 on page 5-4.
- ☐ Those that secure the power supply and logic cards. See Figure 5-1 on page 5-4.

Check for Machine Labels

- ☐ Verify that labels are installed as indicated in Figure 5-1 on page 5-4.
- ☐ Verify that the voltage label matches the voltage stamp on the front of the power supply.

Power Plug Ground Check

With a CE meter set to the RX1 range, check continuity between the ground pin on the power plug and the machine frame.

- ☐ The reading should be 0 ohms.

EPO Power Check, Models 1L and 11L Only

- ☐ Install the power plug in the power receptacle.
- ☐ Set the operator panel rotary switch to offline.
- ☐ Verify that the machine powers on and then turn off power.

Test Verification

Run either of the following tests:

- ☐ Test All 81 (CSU). See "Alt 1 IML Procedures" on page 1-53.
- ☐ Test 82. See "Alt 2 IML Procedures (Test 82)" on page 1-56.
- ☐ Investigate any failure before releasing the machine for customer use.

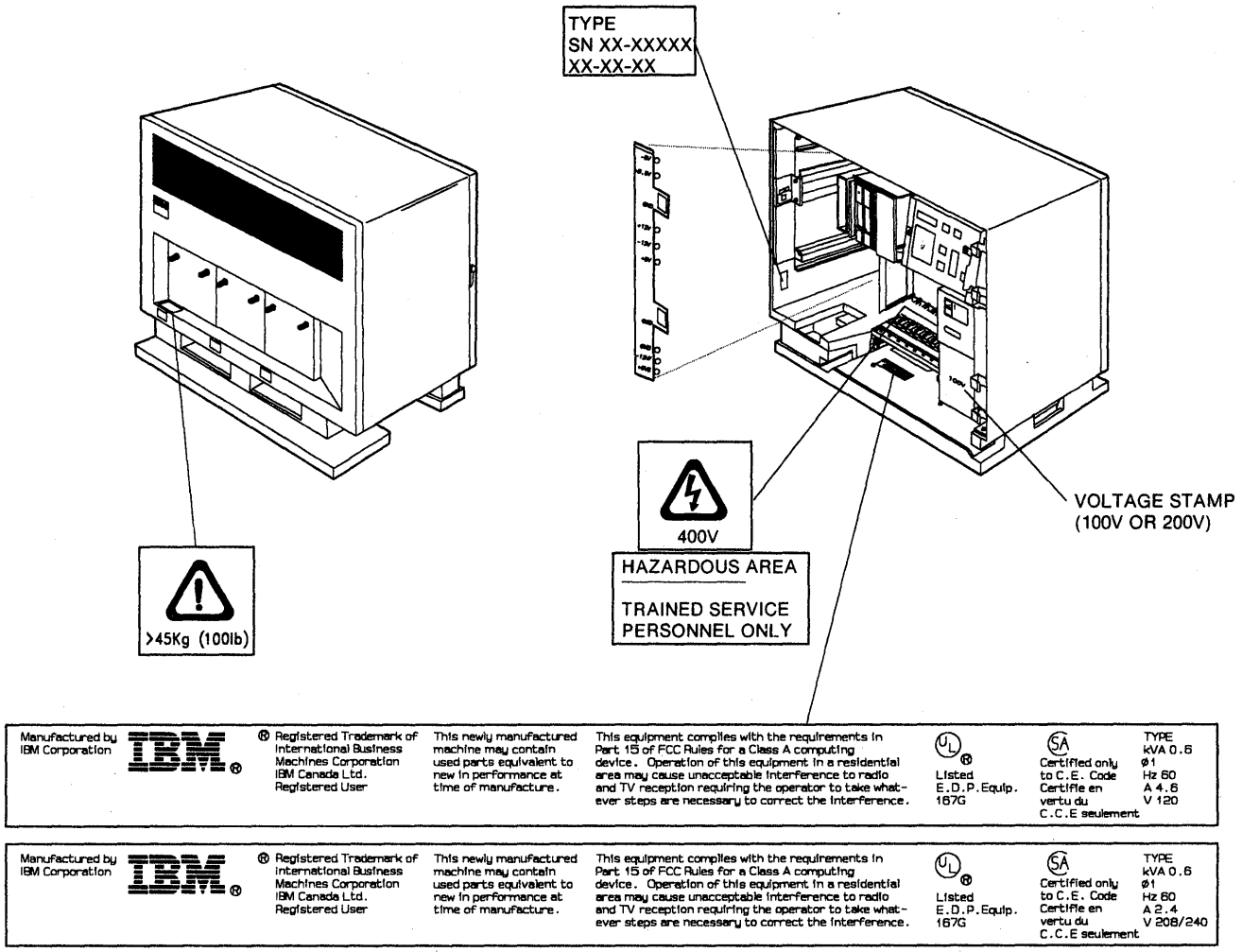


Figure 5-1. 3174 Safety Label Locations

To obtain the part numbers for the labels installed in the controller, see pages 6-2 through 6-5 in the parts catalog.

Chapter 6. Parts Catalog

How To Use This Parts Catalog

• SIMILAR ASSEMBLIES: If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

• AR: (As Required) in the Units column indicates that the quantity is not the same for all machines.

• NP: (Non-Procurable) in the Units column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.

• NR: (Not Recommended) in the Units column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.

• R: (Restricted) in the Units column indicates that the part has a restricted availability.

• INDENTURE: The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

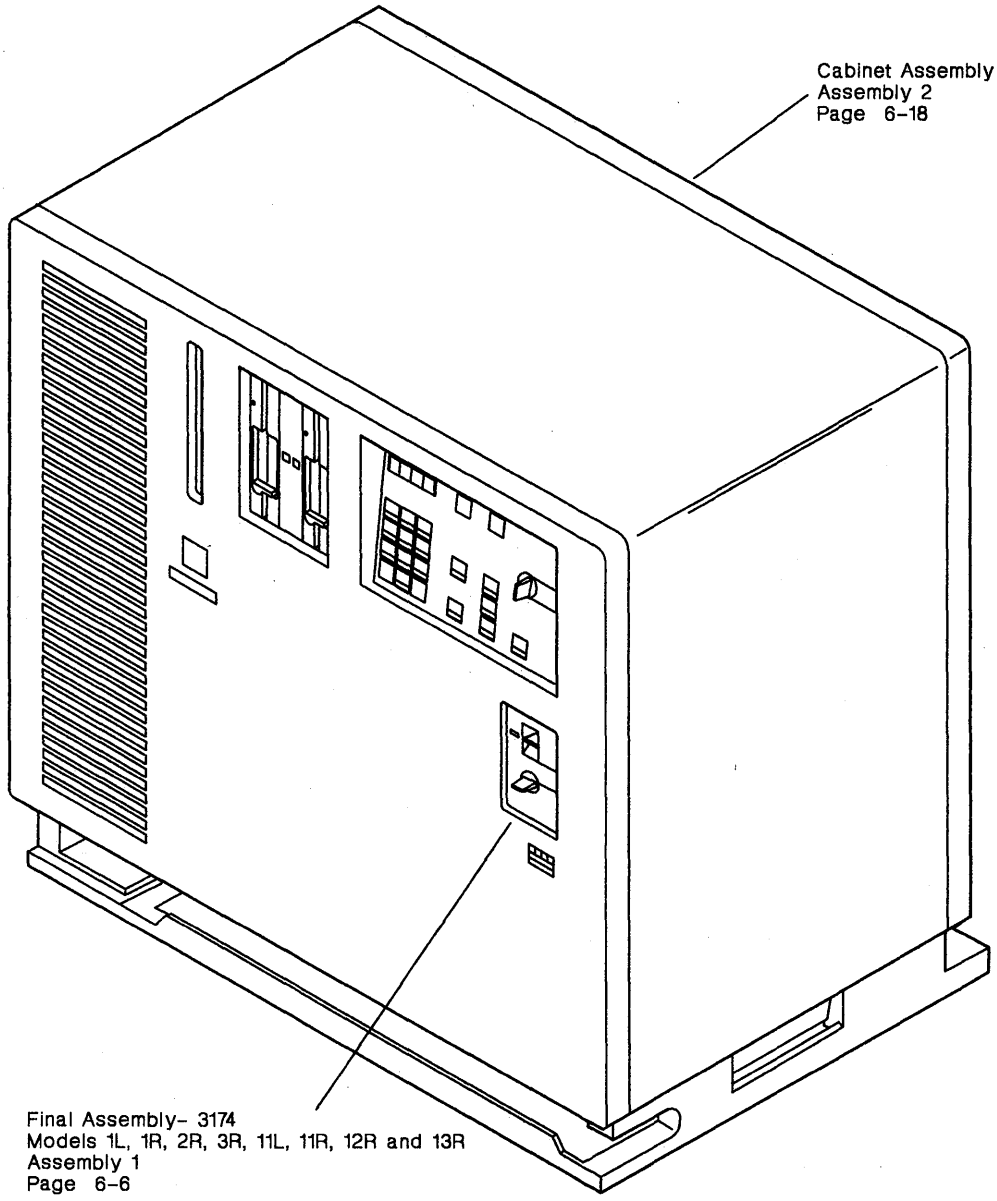
Indenture	Relationship of Parts
(No dot)	MAIN ASSEMBLY
(One dot)	• Detail parts of a main assembly
(One dot)	• Subassembly of the main assembly
(Two dot)	• • Detail part of a one-dot subassembly
(Two dot)	• • Subassembly of a one-dot subassembly
(Three dot)	• • • Detail part of a two-dot subassembly

Assembly *n*: EXAMPLE ASSEMBLY

Asm – Index	Part Number	Units	Description
n –		1	Cover Asm.Rear-Red
–		1	Cover Asm.Rear-White
			For Next Higher Assembly,See 1-2
–1	5373637	1	• Seal,Top
–2	5356429	2	• Clip,Retaining
–3	1847630	R	• Finger Stock Asm
–4	1847602	NR	• • Channel,Finger Stock
–5	5373639	AR	• Seal,Bottom
–6	5356429	2	• Clip,Retaining
–7		NP	• Cover,Rear,Without Paint
–8	416629	2	• Screw,Panel

Assemblies

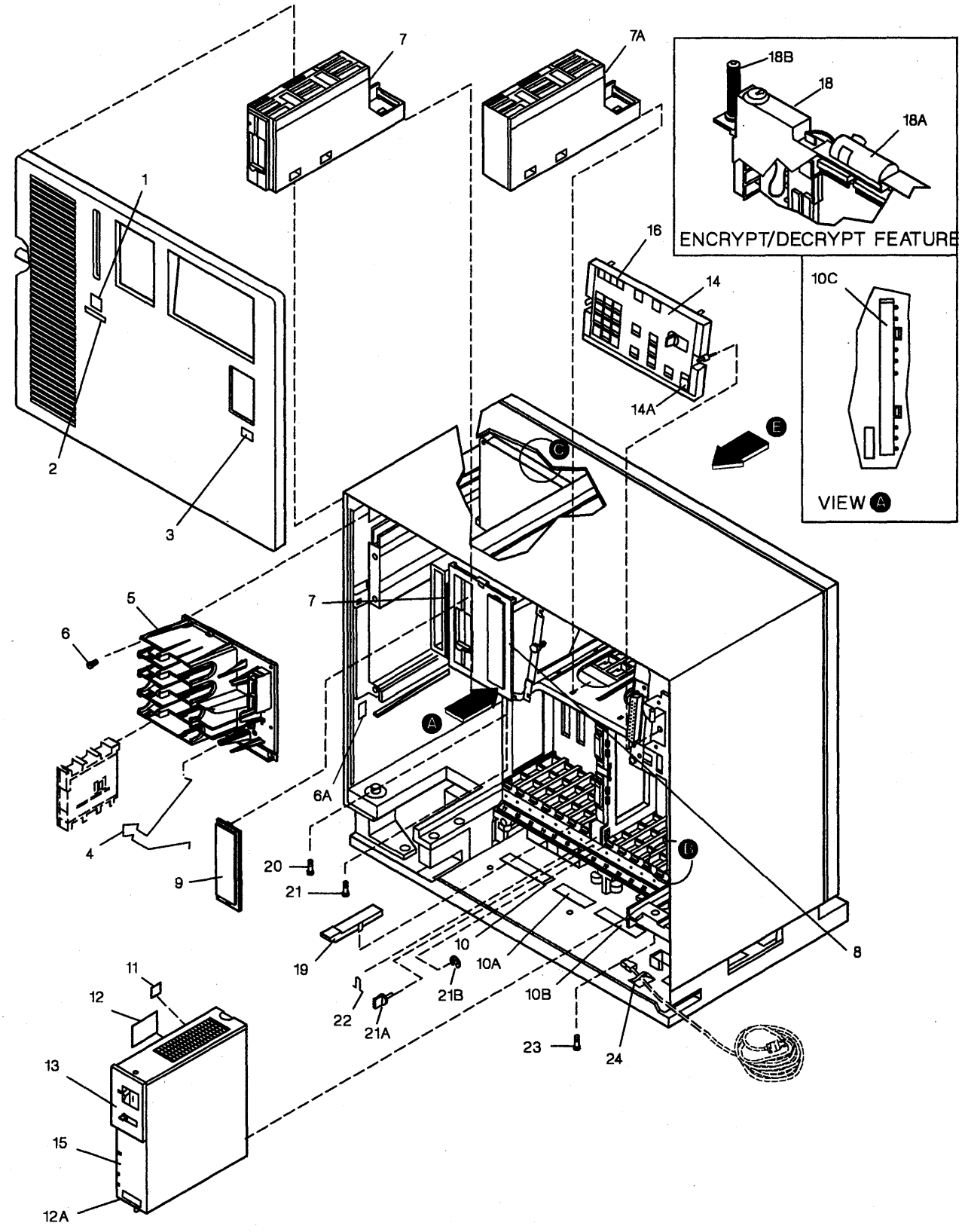
Visual Index I.Final Assembly- 3174 Models 1L,1R,2R,3R,11L,11R,12R and 13R



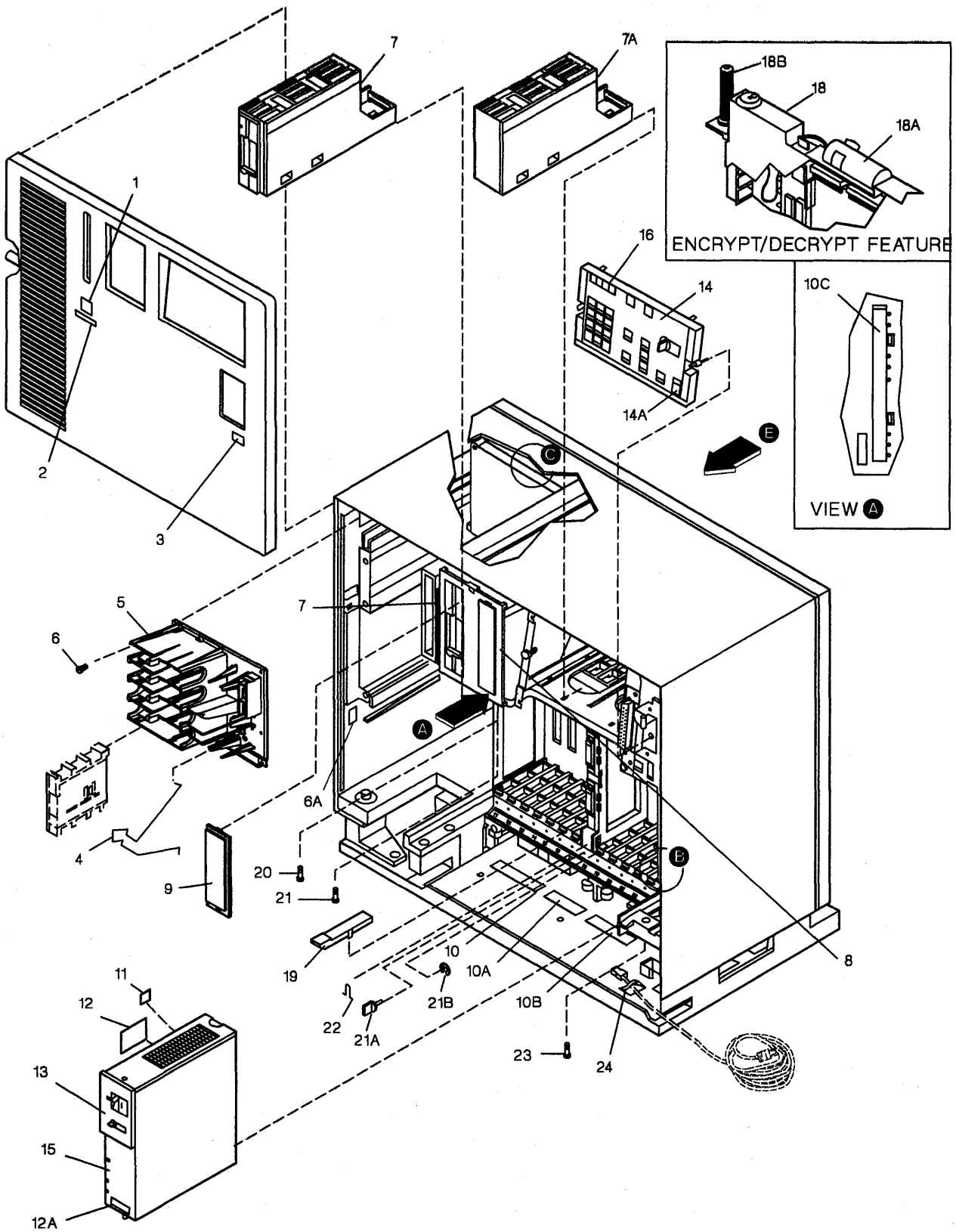
Cable Assemblies With Component Parts
Assembly 3
Page 6-20

Catalog Section

Assembly 1: Final Assembly- 3174 Models 1L,1R,2R,3R,11L,11R,12R and 13R



Asm – Index	Part Number	Units	Description
1–		NP	Final Assembly- 3174
–1	4804706	1	• Nameplate-Model 1L
–1	6168732	1	• Nameplate-Model 1R
–1	6168734	1	• Nameplate-Model 2R
–1	6168736	1	• Nameplate-Model 3R
–1	26F0020	1	• Nameplate-Model 11L
–1	26F0021	1	• Nameplate-Model 11R
–1	26F0022	1	• Nameplate-Model 12R
–1	26F0023	1	• Nameplate-Model 13R
–2	1359009	1	• Label,Export-Netherlands
–3	4804718	1	• Label,Write In
–4	66X2552	1	• Spring
–5	4804690	1	• Bus/Tag Assembly Used on Models 1L and 11L
–6	4420424	4	• Screw,Thd Forming,Hex Wshr HD, 16 Long Used on Models 1L and 11L
–6A	56X4700	1	• Plate-SN/Date Code
–7	61X4546	1	• Diskette Drive,First-1.2 Meg
–7	25F8398	1	• Diskette Drive,First-2.4 Meg
–7	61X4546	1	• Diskette Drive,Second-1.2 Meg(Optional)
–7	25F8398	1	• Diskette Drive,Second-2.4 Meg (Optional)
–7A	8575400	1	• Fixed Disk Assembly
–8	66X2601	1	• Bezel,Blank
–9	66X2602	1	• Bezel,Blank-Second Diskette
–10	6168391	1	• Label,Voltage- 100V-USA/Canada Used on Models 1L,1R,2R, and 3R
–10	6168392	1	• Label,Voltage- 200V-USA/Canada Used on Model 1L
–10	6168393	1	• Label,Voltage- 100V-AFE(South America)
–10	6168394	1	• Label,Voltage- 200V-AFE(South America)
–10	6168395	1	• Label,Voltage- 100V-EMEA
–10	6168396	1	• Label,Voltage- 200V-EMEA
–10	6168397	1	• Label,Voltage- 100V-AFE(Far East)
–10	6168398	1	• Label,Voltage- 200V-AFE(Far East)
–10A	5267920	1	• Label,Plug In Only-English,UK/English, Belgium,Finnish,Swedish,Swiss,Dutch, Danish, and Norwegian
–10A	5267921	1	• Label,Plug In Only-Canadian
–10A	5267922	1	• Label,Plug In Only-French
–10A	5267923	1	• Label,Plug In Only-German
–10A	5267924	1	• Label,Plug In Only-Spanish
–10A	5267925	1	• Label,Plug In Only-Italian
–10A	5267926	1	• Label,Plug In Only-Portuguese
–10A	5267927	1	• Label,Plug In Only-Japanese
–10B	73X3979	1	• Label,BNC-UK Only
–10C	66X2399	1	• Label,Test Location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ENCRYPT/DECRYPT FEATURE
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VIEW A
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6A
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10A
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21B
10B
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21A
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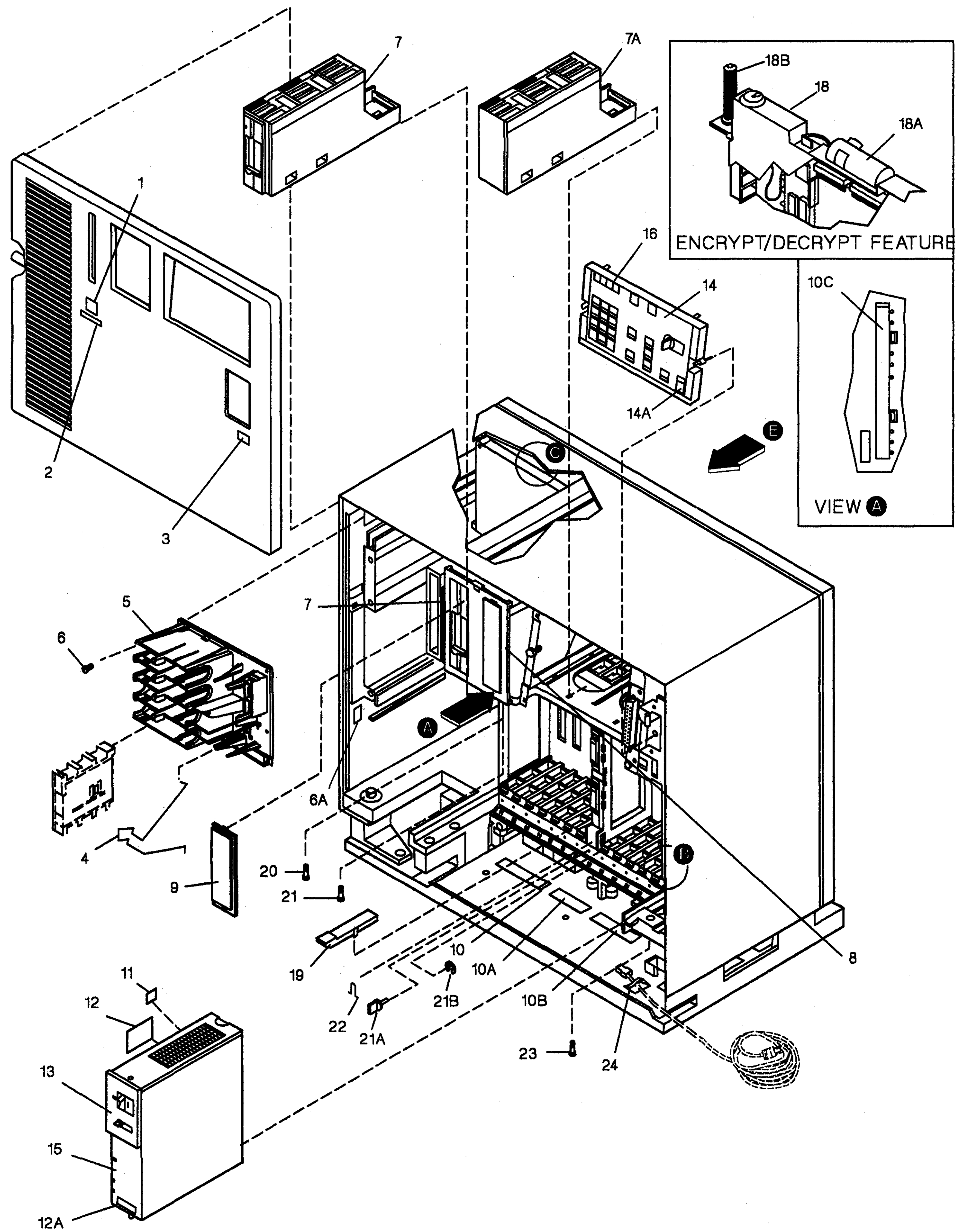
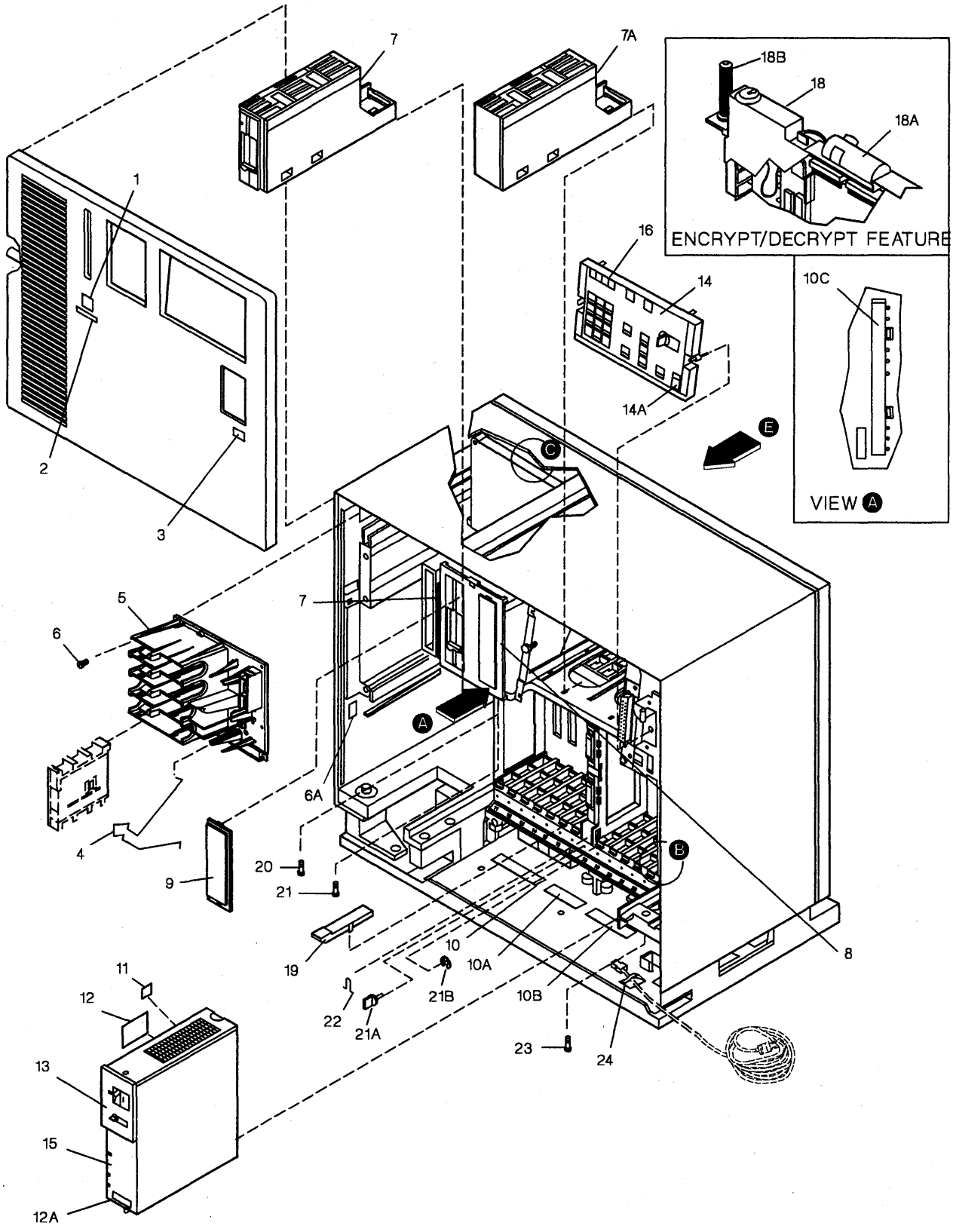
12A

Asm – Index	Part Number	Units	Description
1 – 11	4804663	1	• Label,Danger 400V
– 12	1743549	1	• Label,Hazard Area-UK/English,French, Spanish,German,Italian, and Swiss
– 12	5718466	1	• Label,Hazard Area-English
– 12	6815183	1	• Label,Hazard Area-Portuguese
– 12	8326797	1	• Label,Hazard Area-Japanese
– 12	5685244	1	• Label,Hazard Area-Belgium
– 12	1743548	1	• Label,Hazard Area-Canadian/English
– 12	8326801	1	• Label,Hazard Area-Finnish
– 12	4423212	1	• Label,Hazard Area-Norwegian
– 12	8551904	1	• Label,Hazard Area-Swedish
– 12	5685244	1	• Label,Hazard Area-Dutch
– 12	2677406	1	• Label,Hazard Area-Danish
– 12A	83X9765	1	• Label,Safety-Swedish Only Note: Order Label Separate by Countries
– 13	4804390	1	• Overlay,Power-English Used on Models 1L and 11L
– 13	4804392	1	• Overlay,Power-French Used on Models 1L and 11L
– 13	4804398	1	• Overlay,Power-Spanish Used on Models 1L and 11L
– 13	4804400	1	• Overlay,Power-German Used on Models 1L and 11L
– 13	4804402	1	• Overlay,Power-Portuguese Used on Models 1L and 11L
– 13	4804406	1	• Overlay,Power-Japanese Used on Models 1L and 11L
– 13	4804408	1	• Overlay,Power-Italian Used on Models 1L and 11L
– 13	4804391	1	• Overlay,Power-English,French,Spanish, German,Portuguese, and Italian Used on all Models Except 1L and 11L
– 13	4804407	1	• Overlay,Power-Japanese Used on all Models Except 1L and 11L Note: Order Power Overlay Separate by Countries

Assembly 1: (continued)



Asm – Index	Part Number	Units	Description
1 – 14	6133658	1	• Overlay,Ops Panel-English Used on Models 1L and 11L
– 14	6133660	1	• Overlay,Ops Panel-French Used on Models 1L and 11L
– 14	6133663	1	• Overlay,Ops Panel-Spanish Used on Models 1L and 11L
– 14	6133666	1	• Overlay,Ops Panel-German Used on Models 1L and 11L
– 14	6133669	1	• Overlay,Ops Panel-Portuguese Used on Models 1L and 11L
– 14	6133672	1	• Overlay,Ops Panel-Japanese Used on Models 1L and 11L
– 14	6133675	1	• Overlay,Ops Panel-Italian Used on Models 1L and 11L
– 14	6133659	1	• Overlay,Ops Panel-English Used on all Models Except 1L and 11L
– 14	6133661	1	• Overlay,Ops Panel-French Used on all Models Except 1L and 11L
– 14	6133664	1	• Overlay,Ops Panel-Spanish Used on all Models Except 1L and 11L
– 14	6133667	1	• Overlay,Ops Panel-German Used on all Models Except 1L and 11L
– 14	6133670	1	• Overlay,Ops Panel-Portuguese Used on all Models Except 1L and 11L
– 14	6133673	1	• Overlay,Ops Panel-Japanese Used on all Models Except 1L and 11L
– 14	6133676	1	• Overlay,Ops Panel-Italian Used on all Models Except 1L and 11L Note: Order Ops Panel Overlays Separate by Countries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10B
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21A
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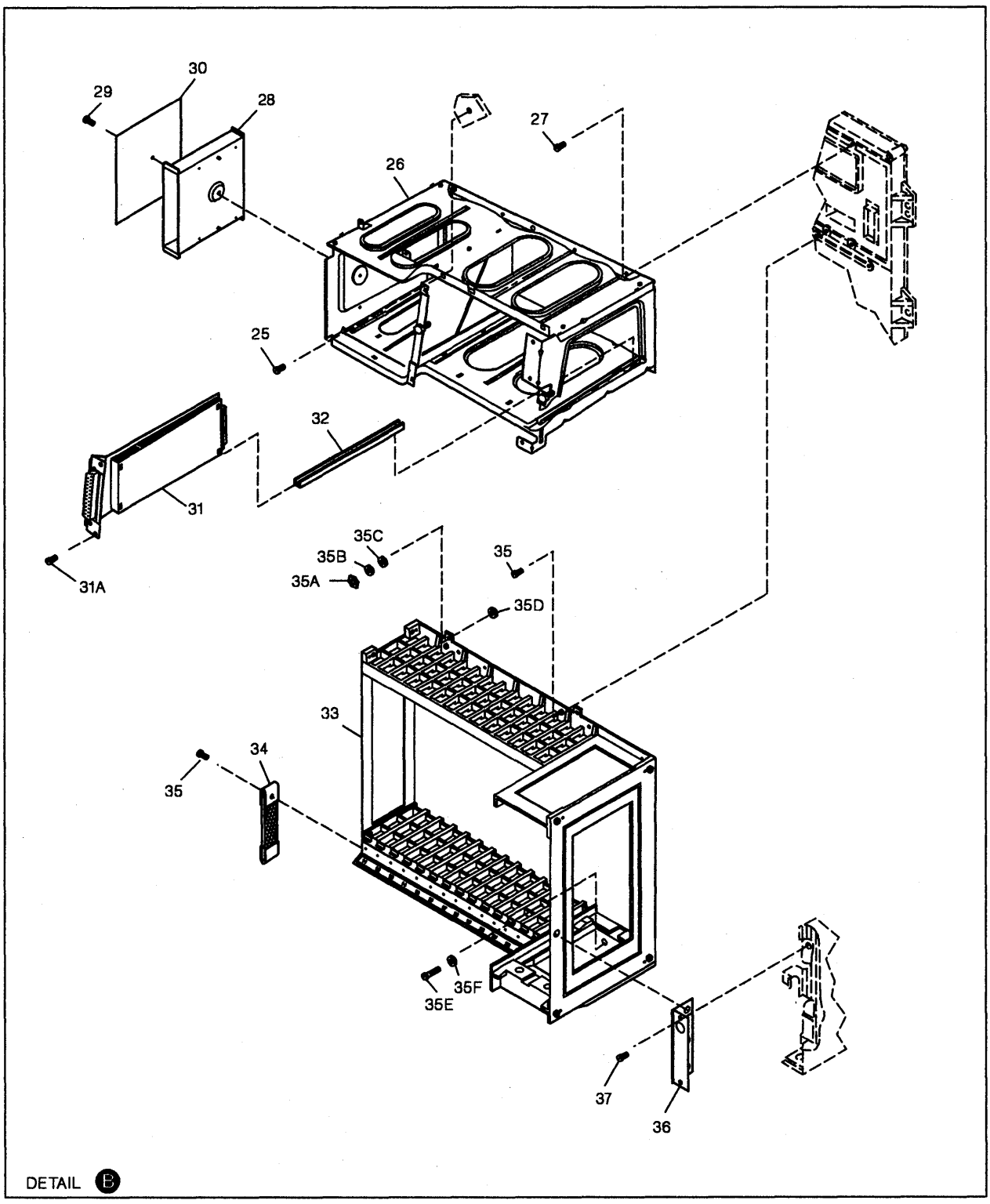
12A

Asm – Index	Part Number	Units	Description
1 – 14A	26F0045	1	• Label,Drive ID
– 15	25F8382	1	• Power Unit, 100V Used on Models 1L and 11L
– 15	25F8383	1	• Power Unit, 200V Used on Models 1L and 11L
– 15	25F8384	1	• Power Unit, 100V-USA/Canada Used on all Models Except 1L and 11L
– 15	25F8385	1	• Power Unit, 200V-WT Only Used on all Models Except 1L and 11L
– 16	4804675	1	• Ops Panel Asm,Used on Models 1L and 11L
– 16	4804680	1	• Ops Panel Asm Used on all Models Except 1L and 11L
– 18	61X4516	1	• Crypto,Asm,Used on Models 1R and 2R Only
– 18A	1743456	1	• • Battery Asm,Encrypt/Decrypt Feature
– 18B	6423222	2	• Thumbscrew
– 19	6168424	1	• Cover,Logic Gate
– 20	66X2436	1	• Thumbscrew,First Diskette Drive
– 21	66X2436	1	• Thumbscrew,Second Diskette Drive
– 21A	6128621	2	• Thumbscrew
– 21B	5267973	2	• Clip,Retaining
– 22	56X4794	2	• Retainer,Spring
– 23	4804648	2	• Thumbscrew,M6
– 24	6168799	2	• Tie,Cable-Releasable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35F
35E
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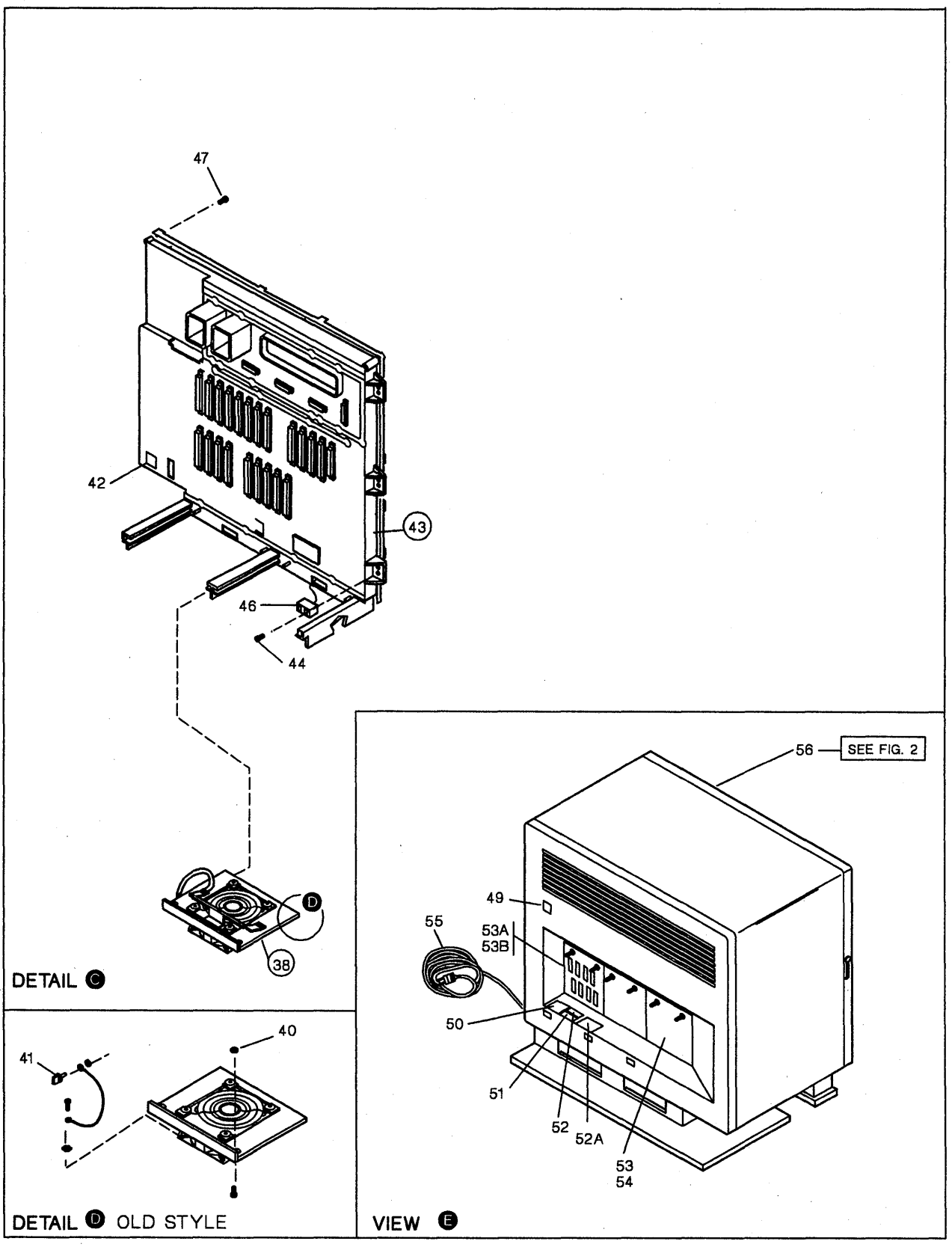
DETAIL B

Asm–Index	Part Number	Units	Description
1–25	1621812	7	• Screw,Thd Form Hex Wshr HD-M4 X 8 Long
–26	6128625	1	• Gate Asm,File/Ops
–27	56X4692	8	• Screw,Hex Wshr HD-Plastite
–28	4804721	1	• Holder
–29	7362385	1	• Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
–30	4804635	1	• Label,Domestic-Model 1L and 11L Only
–31		NP	• Operator Panel Adapter Card
–31A	4804668	2	• Thumbscrew,M4 X 10.2
–32	4804684	1	• Guide,Rail
–33	4804630	1	• Rail Asm
–34	5718286	1	• • Jumper Asm, 6.25 Long
–35	56X4691	8	• Screw,Hex Wsher HD-Plastite Old Style Mounting
–35A	1622403	2	• Nut,Hex-M4 X 7 Fl W X 3.2 Thk New Style Mounting
–35B	1622318	2	• Washer,Lck Spring- 4.1 ID X 7.5 OD X .9T New Style Mounting
–35C	1622304	2	• Washer,Flat- 4.3 ID X 9 OD X .8 Thk New Style Mounting
–35D	1622306	2	• Washer,Flat- 6.6 ID X 12.5 OD X 1.6 Thk New Style Mounting
–35E	1621366	2	• Screw,Hex Cap HD-M4 X 40 Long New Style Mounting
–35F	1622318	2	• Washer,Lck Spring- 4.1 ID X 7.5 OD X .9T New Style Mounting
–36	56X4724	1	• Bracket,Angle Support
–37	4796653	2	• Screw,Metric-Hex Wshr HD-M4 X 6 Long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DETAIL C
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DETAIL D OLD STYLE
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SEE FIG. 2
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53A
53B
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52A
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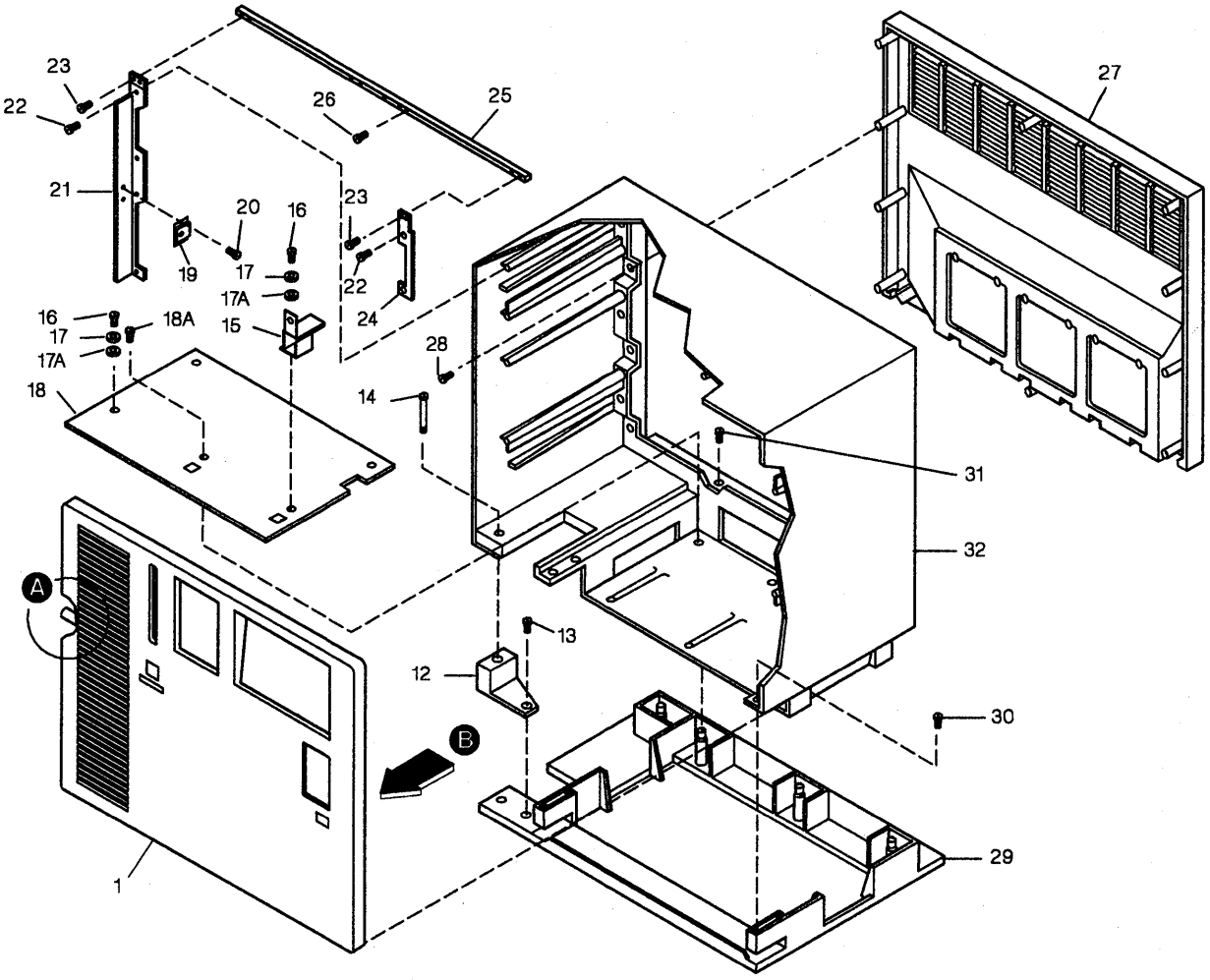
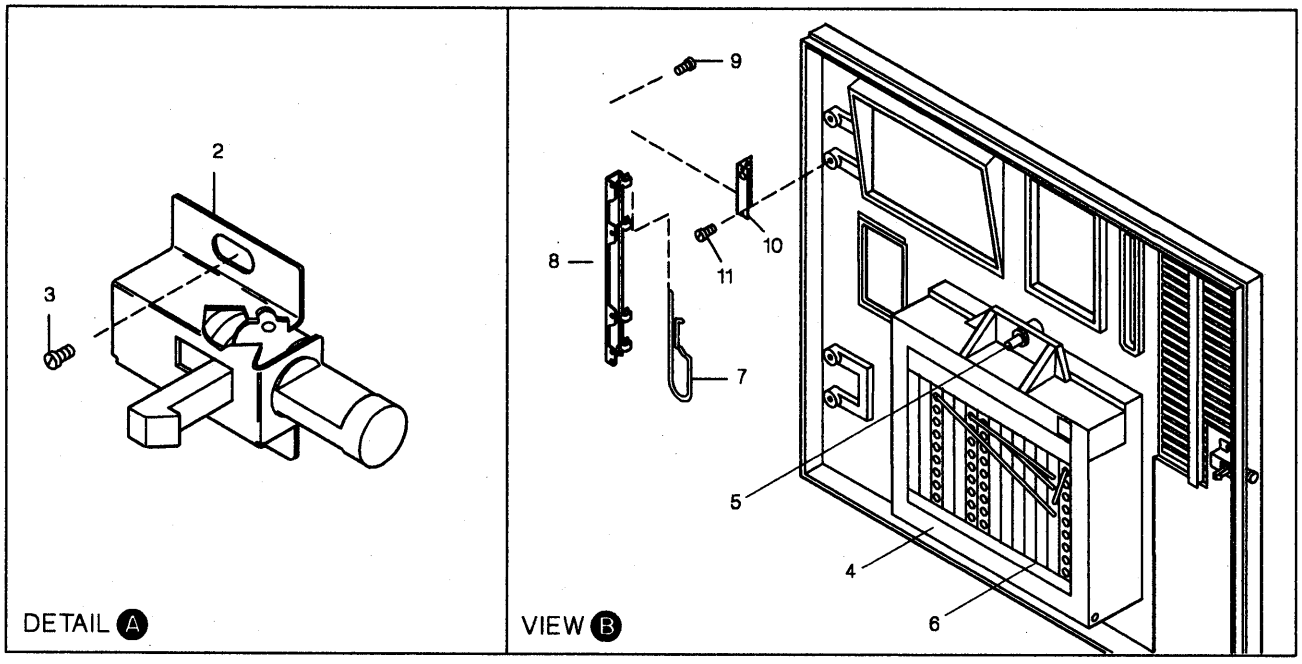
VIEW E

Asm – Index	Part Number	Units	Description
1 – 38	4804665	2	• Plenum Asm-Models 1L,1R, 2R and 3R
– 38	25F7206	2	• Plenum Asm-Models 11L,11R,12R and 13R
– 40	5267973	2	• Clip,Retaining-Old Style Fans Only
– 41	6128621	1	• Thumbscrew-Old Style Fans Only
– 42	811825	1	• Label,Write-in
– 43	56X4738	1	• Frame/Bd Asm,Models 1L,1R,2R and 3R
– 43	25F8427	1	• Frame/Bd Asm,Models 11L,11R,12R and 13R
–	83X9846	1	• Logic Board Kit-Contains Indexes 42, 43 and 44 For Models 1L,1R,2R and 3R
– 44	1622687	6	• Screw
– 46	4804669	1	• • Cable Asm For Component Parts,See Asm 3
– 47	1624770	14	• • Screw
– 49	4804706	1	• Nameplate-Model 1L
– 49	6168732	1	• Nameplate-Model 1R
– 49	6168734	1	• Nameplate-Model 2R
– 49	6168736	1	• Nameplate-Model 3R
– 49	26F0020	1	• Nameplate-Model 11L
– 49	26F0021	1	• Nameplate-Model 11R
– 49	26F0022	1	• Nameplate-Model 12R
– 49	26F0023	1	• Nameplate-Model 13R
– 50	6168746	1	• Label,Weight
– 51	855284	1	• Plate,Mfg Export
– 52	855285	1	• Plate,UK Import
– 52A	73X3979	1	• Label,BNC-UK Only
– 52A	83X9764	1	• Label,PTT German
– 52A	5953429	1	• Label,PTT Australian
– 53	56X4793	3	• Panel Asm,Blank
– 53A	39F7839	AR	• I/O Panel,Asynchronous Emulation-DOM
– 53A	39F7837	AR	• I/O Panel,Asynchronous Emulation-WT
– 53B	4804401	1	• Jumper Asm
– 54	56X4791	6	• Thumbscrew
– 55		1	• Attachment Cord For Cord Part Nos.,See Asm 3
– 56	4804710	1	• Cabinet Assembly For Detail Breakdown,See Asm 2

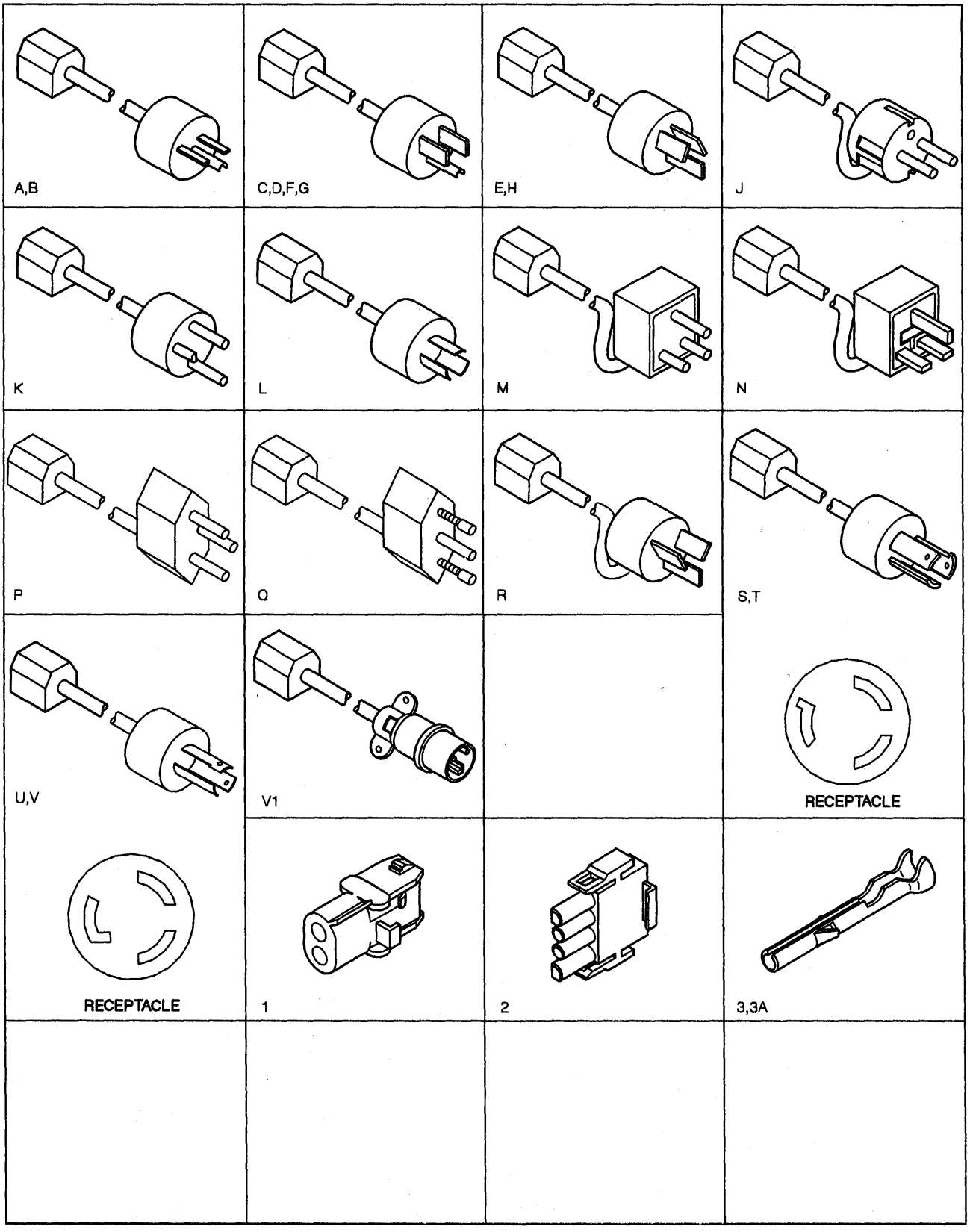
Assembly 2: Cabinet Assembly



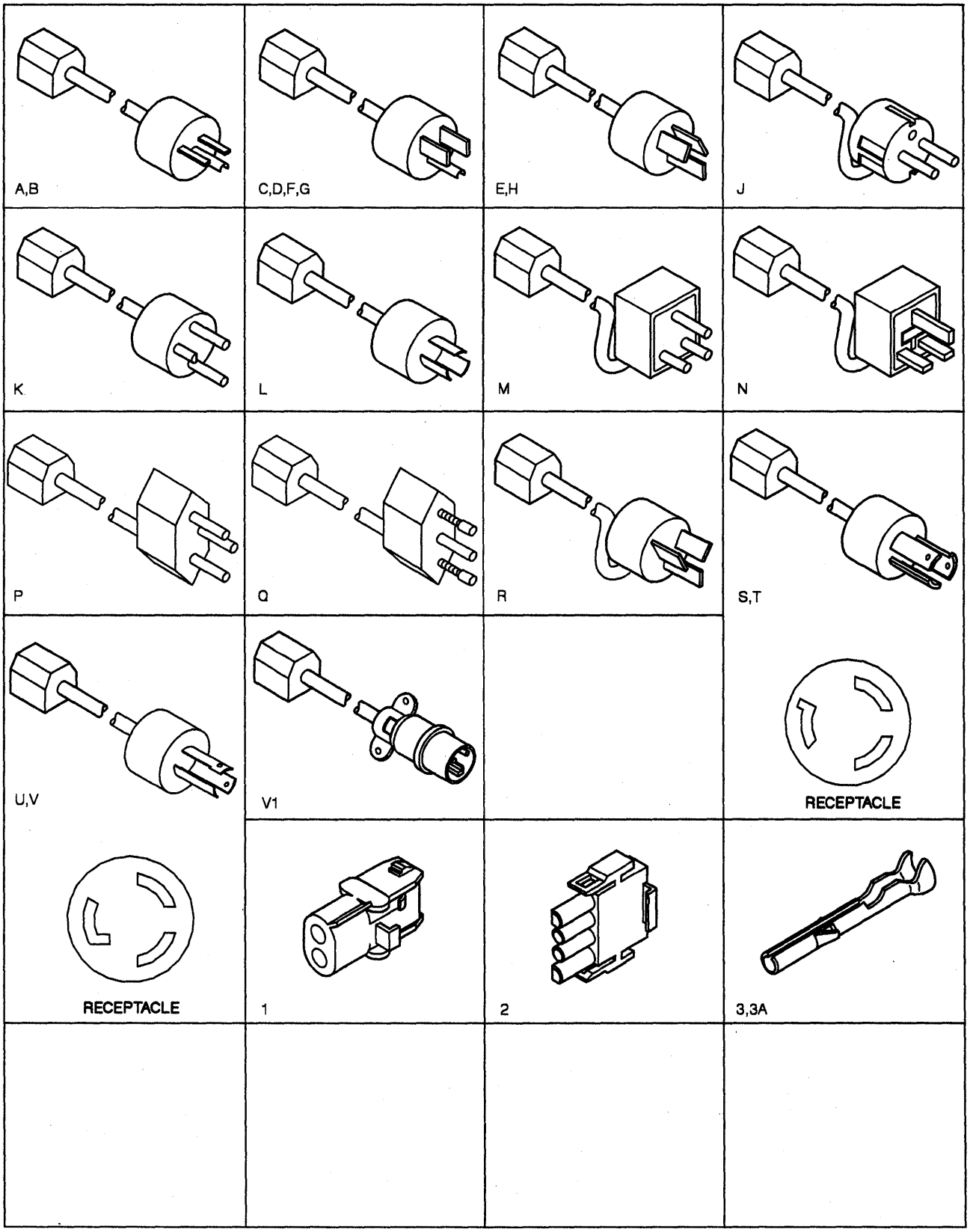


Asm – Index	Part Number	Units	Description
2–	4804710	Ref	Cabinet Assembly For Next Higher Asm,See 1-56
–1	4804713	1	• Cover,Front
–2	4804717	1	• Pushbutton Asm
–3	4796653	2	• Screw,Metric-Hex Wshr HD-M4 X 6 Long
–4	56X4693	1	• Cover,Document
–5	66X2680	4	• Screw,Captive
–6	66X2618	1	• Label,TMA Location(Channel)
–6	66X2619	1	• Label,TMA Location(TP)
–7	4804722	2	• Pin,Hinge
–8	4804716	1	• Hinge
–9	1622687	4	• Screw,Hex Wshr HD-Thd Roll 16mm Long
–10	4804719	2	• Hinge,Front Cover
–11	1622685	4	• Screw,Hex Wshr HD-Thd Roll 10mm Long
–12	4804409	1	• Support,Cabinet
–13	4457486	1	• Screw,Shoulder-M5 X 11mm Long
–14	4804403	1	• Screw,Knurled HD Bolt-M5 X 93mm Long
–15	56X4733	1	• Bracket,Base Support
–16	1624769	2	• Screw,Hex Wshr HD-Thd Roll
–17	1622318	2	• Washer,Lck Spring- 4.1 ID X 7.5 OD X .9T
–17A	1622304	2	• Washer,Flat- 4.3 ID X 9 OD X .8 Thk
–18	4804480	1	• Plate,Base
–18A	1622687	4	• Screw
–19	4804483	1	• Bracket,Striker Plate
–20	7362385	2	• Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
–21	61X4548	1	• Bracket,Left Support Bar
–22	1622685	4	• Screw,Hex Wshr HD-Thd Roll 10mm Long
–23	1621832	4	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–24	61X4549	1	• Bracket,Right
–25	61X4547	1	• Bracket,Cabinet
–26	2622689	2	• Screw,Hex Wshr HD-Thd Roll 25mm Long
–27	4804714	1	• Cover,Rear
–28	1622683	10	• Screw,Hex Wshr HD-Thd Roll 16mm Long
–29	4804712	1	• Cover,Cabinet Base
–30	1622687	3	• Screw,Hex Wshr HD-Thd Roll 16mm Long
–31	1622686	4	• Screw,Hex Wshr HD-Thd Roll 12mm Long
–32	4804711	1	• Cabinet

Assembly 3: Cable Assemblies With Component Parts



Asm – Index	Part Number	Units	Description
3 – A	1838573	1	Attachment Cord,Pwr(10A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure A
– B	1838576	1	Attachment Cord,Pwr(10A/250V) 1.8m Unshielded-USA For Molded Plug,See Figure B
– C	1838584	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-USA(Hospital Shield) For Molded Plug,See Figure C
– D	1838587	1	Attachment Cord,Pwr(10A/125V) 1.8m Unshielded-USA(Hospital Shield) For Molded Plug,See Figure D
– E	6952290	1	Attachment Cord,Pwr(10A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure E
– F	6952299	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure F
– G	6952301	1	Attachment Cord,Pwr(10A/125V) 1.8m Unshielded-USA For Molded Plug,See Figure G
– H	6952310	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure H
– J	6952319	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure J
– K	6952328	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-Denmark/EMEA For Molded Plug,See Figure K
– L	6952337	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-Japan/AFE/USA For Molded Plug,See Figure L
– M	6952346	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure M
– N	6952355	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure N
– P	6952364	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-EMEA For Molded Plug,See Figure P
– Q	6952373	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure Q
– R	6952382	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-Israel/EMEA For Molded Plug,See Figure R


A,B
C,D,F,G
E,H
J
K
L
M
N
P
Q
R
S,T
RECEPTACLE
U,V
V1
RECEPTACLE
1
2
3,3A

Asm – Index	Part Number	Units	Description
3 – S	7842122	1	Attachment Cord,Pwr(10A/250V) Twist Lock, 1.8m Unshielded-USA For Molded Plug,See Figure S
– T	7842124	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 4.3m Unshielded-USA For Molded Plug,See Figure T
– U	7842140	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 1.8m Unshielded-USA For Molded Plug,See Figure U
– V	7842142	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 4.3m Unshielded- USA/Canada/Nicaragua For Molded Plug,See Figure V
– V1	6168689	1	Attachment Cord,Pwr 4.3mm Long Unshielded-WT Only For Molded Plug,See Figure V1
– V1	6168690	1	Attachment Cord,Pwr 1.8mm Long Unshielded-WT Only For Molded Plug,See Figure V1
– W	4804669	1	Cable Asm-Fan For Component Part,See Indexes 1,2,3, and 3A
– W	4804698	1	Jumper Asm,Coax-TA to TMA
– X	6168155	1	Cable Asm-External,X.21 - 6m
– X	6168156	1	Cable Asm-External,X.21 - 12m
– Y	39F7858	1	Cable Asm-External,EIA- 6m
– Y	6423154	1	Cable Asm-External,EIA- 12m
– Z	25F8490	1	Cable Asm-External,V.35 - 6m-USA/WT
– Z	6423327	1	Cable Asm-External,V.35 - 12m-USA/WT
– AA	25F8491	1	Cable Asm-External,V.35 - 6m-France and Switzerland
– AA	6423328	1	Cable Asm-External,V.35 - 12m-France and Switzerland
– BB	6165837	1	Cable Asm-External,Token Ring Network 4 Mbps
– BB	25F8508	1	Cable Asm-External,Token Ring Network 4/16 Mbps
– 1	1847524	AR	• Plug, 2 Ckt Universal
– 2	1847528	AR	• Plug, 4 Ckt Universal
– 3	1847521	AR	• Terminal,Pin- 20-14 AWG .760 Long
– 3A	1847523	AR	• Terminal,Pin- 20-14 AWG .780 Long

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1621832	2 – 23	6-19
1622304	1 – 35C	6-15
	2 – 17A	6-19
1622306	1 – 35D	6-15
1622318	1 – 35B	6-15
	1 – 35F	6-15
	2 – 17	6-19
1622403	1 – 35A	6-15
1622683	2 – 28	6-19
1622685	2 – 11	6-19
	2 – 22	6-19
1622686	2 – 31	6-19
1622687	1 – 44	6-17
	2 – 9	6-19
	2 – 18A	6-19
	2 – 30	6-19
1624769	2 – 16	6-19
1624770	1 – 47	6-17
1743456	1 – 18A	6-13
1743548	1 – 12	6-9
1743549	1 – 12	6-9
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1838576	3 – B	6-21
1838584	3 – C	6-21
1838587	3 – D	6-21
1847521	3 – 3	6-23
1847523	3 – 3A	6-23
1847524	3 – 1	6-23
1847528	3 – 2	6-23
25F7206	1 – 38	6-17
25F8382	1 – 15	6-13
25F8383	1 – 15	6-13
25F8384	1 – 15	6-13
25F8385	1 – 15	6-13
25F8398	1 – 7	6-7
	1 – 7	6-7
25F8427	1 – 43	6-17
25F8490	3 – Z	6-23
25F8491	3 – AA	6-23
25F8508	3 – BB	6-23
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26F0021	1 – 1	6-7
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26F0022	1 – 1	6-7
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26F0023	1 – 1	6-7
	1 – 49	6-17
26F0045	1 – 14A	6-13
2622689	2 – 26	6-19
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39F7839	1 – 53A	6-17
39F7858	3 – Y	6-23
4420424	1 – 6	6-7
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4804398	1 – 13	6-9
4804400	1 – 13	6-9
4804401	1 – 53B	6-17
4804402	1 – 13	6-9
4804403	2 – 14	6-19
4804406	1 – 13	6-9
4804407	1 – 13	6-9
4804408	1 – 13	6-9
4804409	2 – 12	6-19
4804480	2 – 18	6-19
4804483	2 – 19	6-19
4804630	1 – 33	6-15
4804635	1 – 30	6-15
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4804712	2 – 29	6-19
4804713	2 – 1	6-19
4804714	2 – 27	6-19
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6133660	1 – 14	6-11
6133661	1 – 14	6-11
6133663	1 – 14	6-11
6133664	1 – 14	6-11
6133666	1 – 14	6-11
6133667	1 – 14	6-11
6133669	1 – 14	6-11
6133670	1 – 14	6-11
6133672	1 – 14	6-11
6133673	1 – 14	6-11
6133675	1 – 14	6-11
6133676	1 – 14	6-11
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6168156	3 – X	6-23
6168391	1 – 10	6-7
6168392	1 – 10	6-7
6168393	1 – 10	6-7
6168394	1 – 10	6-7
6168395	1 – 10	6-7
6168396	1 – 10	6-7
6168397	1 – 10	6-7
6168398	1 – 10	6-7
6168424	1 – 19	6-13
6168689	3 – V1	6-23
6168690	3 – V1	6-23
6168732	1 – 1	6-7
	1 – 49	6-17
6168734	1 – 1	6-7
	1 – 49	6-17
6168736	1 – 1	6-7
	1 – 49	6-17
6168746	1 – 50	6-17
6168799	1 – 24	6-13
6423154	3 – Y	6-23
6423222	1 – 18B	6-13
6423327	3 – Z	6-23
6423328	3 – AA	6-23
66X2399	1 – 10C	6-7
66X2436	1 – 20	6-13
	1 – 21	6-13
66X2552	1 – 4	6-7
66X2601	1 – 8	6-7
66X2602	1 – 9	6-7
66X2618	2 – 6	6-19
66X2619	2 – 6	6-19
66X2680	2 – 5	6-19
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6952299	3 – F	6-21
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6952310	3 – H	6-21
6952319	3 – J	6-21
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6952337	3 – L	6-21
6952346	3 – M	6-21
6952355	3 – N	6-21
6952364	3 – P	6-21
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Appendix A. IBM Cabling System

The IBM Cabling System allows customers to interconnect devices within a single building or a group of buildings located close together. This cabling system uses a star wiring arrangement, which means that individual cables run from a concentration point to each user's work area. Figure B-1 shows an example of a typical cabling system installation.

Note: This appendix is not intended to give full details on the IBM Cabling System. It is here as an aid in problem determination for the 3174 Establishment Controller. For further details, see the *IBM Cabling System Planning and Installation Guide,* GA27-3361.

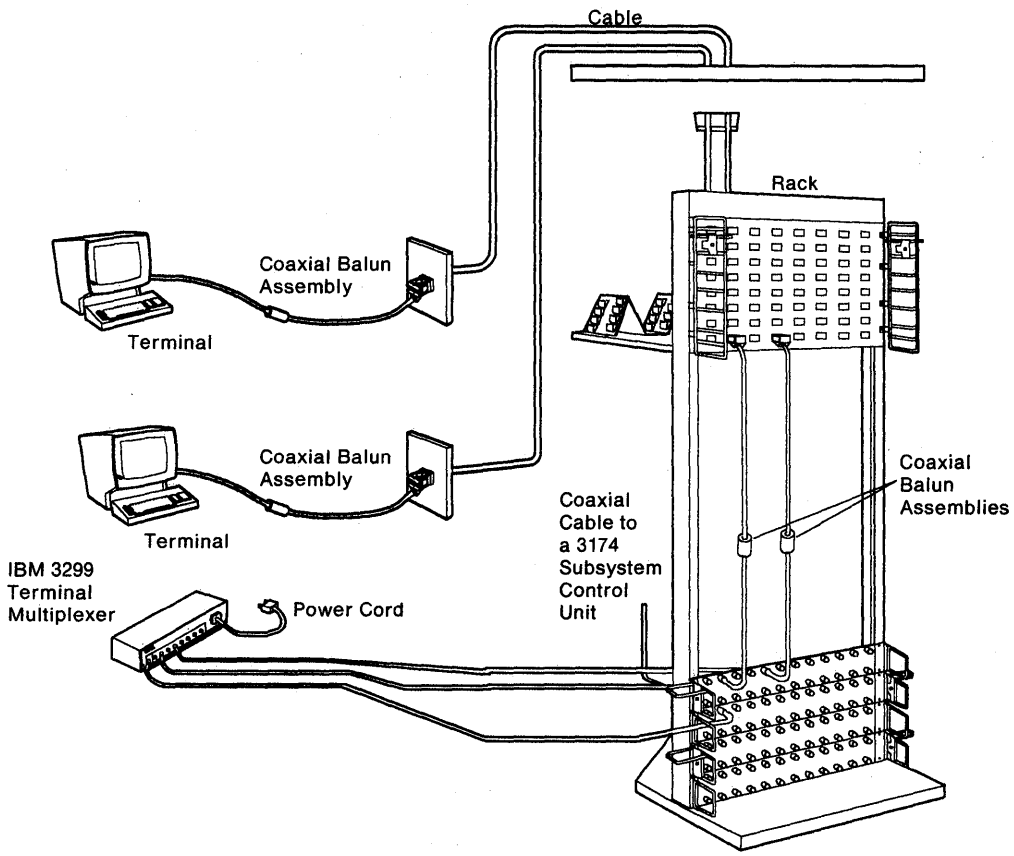


Figure A-1. IBM Cabling System

3299 Terminal Multiplexer Reference Information

This section contains information about 3299 Terminal Multiplexers Models 1, 2, and 3 and IBM Cabling System (ICS) cables that can be used with the 3299. This information is not intended to provide all the details about 3299s and the IBM Cabling System. It is here as an aid in problem determination for the 3174 Establishment Controller.

The 3299 Terminal Multiplexer attaches to port 0 on the 3174 terminal adapter. The input signals from the terminal adapter contain addressing to select one of eight possible 3299 output driver/receiver ports. The distance 3299s are located from the controller depends on the cable media being used and whether the particular 3299 requires a balun. See Table A-1.

3299 Model 1

The 3299 Terminal Multiplexer Model 1 is packaged in a single box that contains circuitry to multiplex the data streams of eight terminals onto a single coaxial or twisted-pair cable from the 3174. It also increases the distance that terminals can be located from the 3174 as shown in Table A-1.

3299 Model 2

The 3299 Model 2 is a modified version of the 3299 Model 1. It provides the capability of being attached to the IBM Cabling System directly either with coaxial cable or IBM data grade twisted-pair cables. Telephone twisted-pair cables can also be used, although they require an IBM/ROLM balun. A wrap test can be performed on the 3299 Model 2 that is attached to a 3174. The microcode to drive this test is in the 3174.

3299 Model 3

The 3299 Model 3 is identical in function to the 3299 Model 2. The primary difference is that it connects directly to the telephone twisted-pair. The eight output ports on the Model 3 are RJ11 type connectors which accept only telephone twisted-pair (TTP). The connection to the 3174 is through coaxial cable or through the IBM Cabling System using a dual purpose connector (DPC). This connector accepts either a BNC style connector or an IBM Cabling System connector. A wrap test can be performed on the 3299 Model 3 that is attached to a 3174. The microcode to drive this test resides in the 3174.

Note: Only IBM Cabling System type 3 specified cable is supported from the 3299 Model 3 to a terminal. Flat telephone wire and stubs (wires that are not terminated) are not supported.

Table A-1. 3299 Attached Terminal Cable Lengths

Cable Media	Baluns	Maximum Distance from 3299
Coaxial Cable	None required	1525 Meters (5000 Feet)
IBM Cabling System Type 1 or 2 Cable	0	1525 Meters (5000 Feet)
IBM Cabling System Type 1 or 2 Cable	1	1000 Meters (3280 Feet)
IBM Cabling System Type 1 or 2 Cable	2	610 Meters (2000 Feet)
IBM Cabling System Type 3 Cable	1	274 Meters (900 Feet)
IBM Cabling System Type 3 Cable	2	30 – 274 Meters (100 – 900 Feet)

Note: Terminals with the dual-purpose connector (DPC) have the driver/receiver circuitry that does not require the use of baluns. The DPC connector on these terminals accepts coaxial cable and IBM Cabling System Type 1 and Type 2 cables. A balun is an impedance matching device that is required when cabling media other than coaxial cable is used to attach terminals such as 3278s to

the controller. The balun matches the impedance of the cable being used to the impedance of the 3278 driver/receiver circuitry.

3299 Model Interchangeability

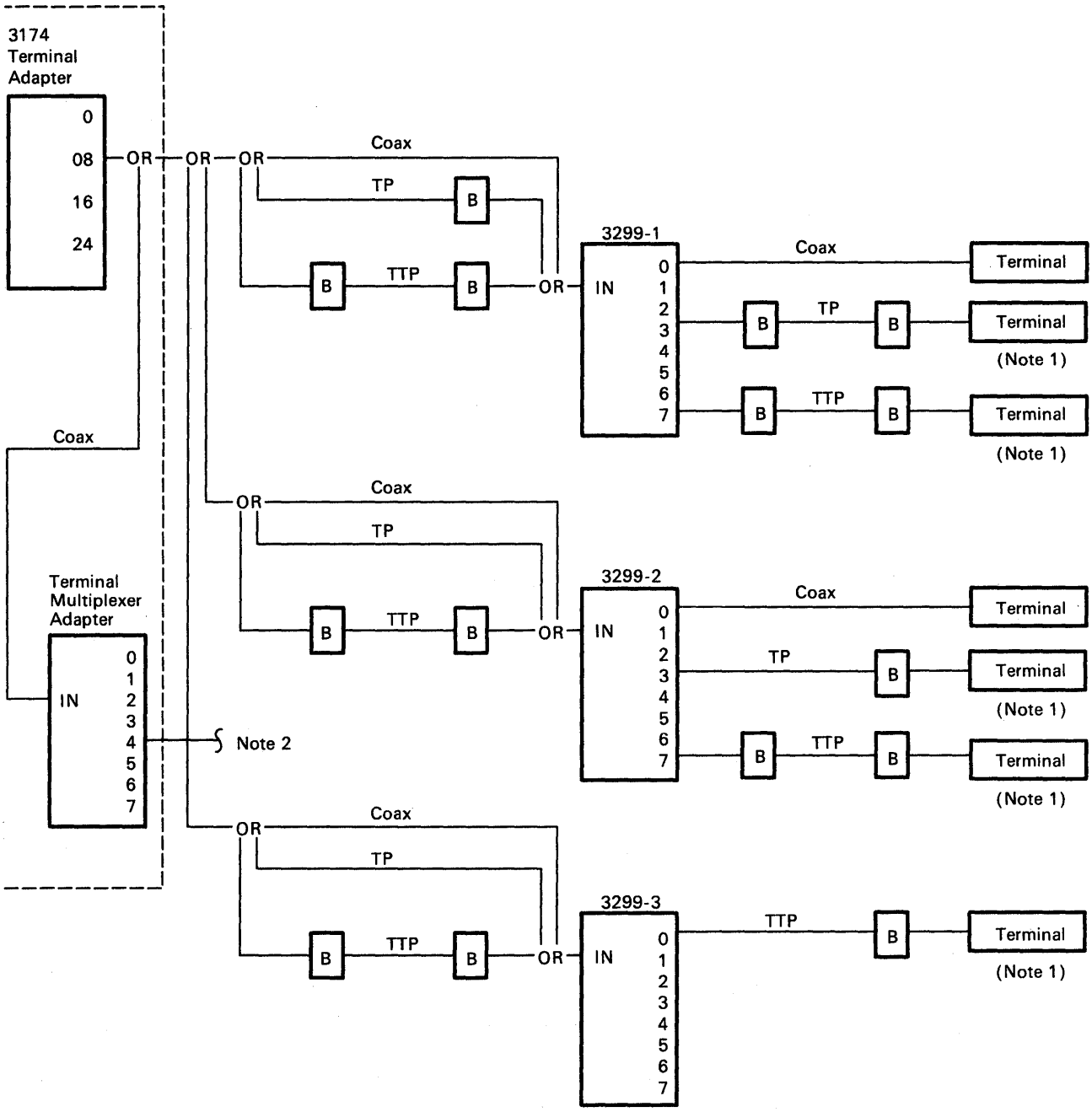
The 3299 is a service exchange center product. Fault isolation and resolution are customer responsibilities. To improve availability it is recommended to the customer that a minimum number of spare 3299s should be purchased, depending on the number of 3299s installed. When a customer is exchanging 3299s during problem determination the following rules should be followed:

- A 3299 Model 1 can be replaced with a Model 1 or a Model 2
- A 3299 Model 2 can be replaced only with a Model 2.

  Note: If coaxial cable is the only cable media being used to connect the terminals to the 3299, then a 3299 Model 2 can be replaced with a Model 1.
- A 3299 Model 3 can be replaced only with a Model 3.

3299 Cabling

Figure A-2 on page A-5 shows the possible subsystem cabling for the 3299 Models 1, 2, and 3 with the different type of cabling media that is supported with and without baluns.



B = Balun
TP = Twisted Pair, IBM Cabling System Type 1, 2
TTP = Telephone Twisted Pair, IBM Cabling System Type 3

Notes: 1. Terminals with the new dual-purpose connector (DPC) have driver receivers that do not require the use of baluns.

2. This has the same output capability as a 3299-2.

Figure A-2. 3299 Cabling

Device Signal Cable Media Connectors

With the availability of different types of cable media and cable media connectors, it is important to identify which type of connector is being used.

Older 3270 products, such as Model 1 3299s use a standard BNC jack and accept only standard BNC connectors that are used with coaxial cabling or the coax to twisted-pair balun. New 3270 products, such as the 3174, and some new display products, use the dual-purpose connector (DPC) jack, which is designed to accept both the coaxial BNC connector and the dual-purpose connector.

The products that use the DPC connector have two sets of cable media matching circuitry to support the attachment of coaxial cable or IBM Cabling System cable media. The connector on the cable mechanically connects the proper impedance matching circuit elements to the product DPC jack.

The BNC and DPC jacks are not easily distinguished; however, there are slight differences. The inner center conductor insulator on the DPC jack has an additional conductor located in the center. The DPC cable connector is identified by an insulator tube that extends approximately 5mm (3/16 of an inch) beyond the body of the connector. See Figure A-3.

Because of this insulator the DPC connector cannot be connected to a BNC jack. However, a BNC connector can be connected to a DPC jack.

When swapping device cables, it is very important to swap a cable only with another cable that has an identical connector on the end of the cable.

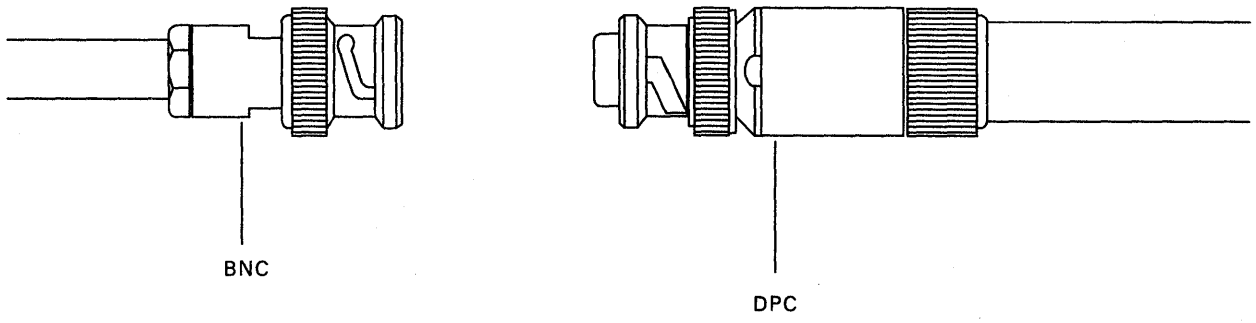


Figure A-3. BNC and DPC Connectors.

Appendix B. X.25 Feature

X.25 Feature

The Type 1 Communication Adapter and Type 1 Concurrent Communication Adapterin the 3174 Establishment Controller enables the 3174 to communicate with host systems through an X.25 network. IBM-defined SNA protocols are used. The SNA protocols used by the 3174 are identical with existing 3274 SNA attachments. They are not detailed here. These SNA protocols are described in the *3174 Functional Description*, GA23-0218 and *X.25 Operations*, GA23-0214.

The International Telegraph and Telephone Consultative Committee (CCITT) recommendation is that X.25 define an interface between customer data terminal equipment (DTE) and data circuit-terminating equipment (DCE) to attach DTEs to Packet Switched Data Networks (PSDNs).

The definition includes:

Physical Level	The mechanical, electrical, functional, and procedural characteristics to activate, maintain, and deactivate physical communication links between DTEs and DCEs.
Link Level	The link access procedure for interchange of data across communication links between DTEs and DCEs.
Packet Level	The packet formats and logical protocols for the exchange of control information and user data between DTEs and DCEs.

To use the X.25 function, the 3174 must have a 3278, 3279, or similar display station attached.

X.25 Elements

Physical Level

- X.21 leased circuit
- X.21 bis (V.24 or V.35) leased circuit
- CCITT
- Transmission is (NRZ) non-return to zero with clocking externally supplied
- Up to 64Kbps

Link Level

- Link Access Procedure Balanced (LAPB)
- Modulo 8 Link Level Sequence Numbering

Packet Level

- Single virtual circuit (switched or permanent)
- Modulo 8 or 128 packet-level sequence numbering
- Data packet sizes of 64, 128, 256, or 512 bytes
- Packet window sizes of 1 to 7 for modulo 8
- Packet window sizes of 1 to 11 for modulo 128

Logical Link Control

One of the following:

- Qualified Logical Link Control (QLLC)
- Physical Services Header (PSH).

Timers

The timer values listed in Table B-1 are supplied. These values are derived from the type 1 communication adapter timers and have an accuracy of the stated values plus or minus 20%.

Table B-1. X.25 Timer Values

Timer	Value (In Seconds)	5NN
Receive timeout	30	532 20
Packet timeout	200	532 21
Transmit failure (write timeout)	36	501 04
Open timeout	25.6	506 02
Tp(T1)/Np(N2)	Customer-specified values (configuration responses 450 and 451)	

X.25 Network

This section describes X.25 virtual circuits and logical channels.

Virtual Circuits

A permanent virtual circuit (PVC) may be thought of as a point-to-point SDLC leased line. A switched virtual circuit (SVC) may be thought of as a point-to-point switched line.

Logical Channels

Each virtual circuit is assigned a logical channel group number (0 – 15) and a logical channel number (1 – 255) by the Packet Switched Data Network (PSDN). These two numbers make up the logical channel identifier (LCID). This LCID may be entered while 3174 is being configured.

The following logical-channel types may exist:

Permanent channel — Used for a PVC dedicated to data transfer between a 3174 and a specific host DTE.

Outgoing channel — Used for an SVC where only the 3174 can initiate a call.

Incoming channel — Used for an SVC where only a remote DTE can initiate a call.

Two-Way channel — Used for an SVC where either the 3174 or the remote DTE can initiate a call.

Packet Types

The following X.25 packet types are supported by the 3174. The cause and diagnostic codes mentioned in the descriptions are defined later in this appendix.

Call Request (SVC)

The Call Request packet is transmitted by the 3174 when an X.25 dial operation is performed by the operator. This packet contains the called number and optional information which matches the user's subscription. The optional information is based on the options selected while configuring or operator input.

Incoming Call (SVC)

The Incoming Call packet is received by the 3174 as a result of a remote DTE transmitting a Call Request Packet. The 3174 examines the data in the packet (based on options selected during configuration) to ensure that it conforms to the information configured or as specified by the display operator through a dial operation.

Call Accepted (SVC)

The Call Accepted packet is sent by the 3174 after an Incoming Call packet has been received that conforms to the network facilities specified.

Call Connected (SVC)

The Call Connected packet is received by the 3174 as confirmation that the remote DTE has accepted the 3174's Call Request. The circuit is now in the data-ready state, and SNA protocols may begin.

Clear Request (SVC)

The Clear Request packet is sent by the 3174 as a result of an X.25 disconnect operation by the operator or the network (normal circuit termination), or as a result of certain errors detected by the 3174 or the network. Cause and diagnostic codes are included. If caused by a 3174-detected error, the codes are logged and displayed by the operator.

Clear Indication (SVC)

The Clear Indication packet is received by the 3174 as a result of a normal clearing sequence, or as a result of problems detected by the network or the remote DTE. The circuit is stopped, a Clear Confirmation packet is sent, and nonzero cause and diagnostic codes are logged and displayed to the operator.

Clear Confirmation (SVC)

The Clear Confirmation Packet is sent by the 3174 to acknowledge the receipt of a Clear Indication packet or may be received by the 3174 in a network response to Clear Request packet.

Reset Request (PVC)

The Reset Request packet is sent when the 3174 detects certain X.25 errors. Cause and Diagnostic codes are included and logged. The 3174 then attempts to reopen the circuit. The Reset Request packet is not sent during normal PVC operation wherein the 3174 remains connected to the circuit/link until powered off. A Reset Request packet is sent as part of a LOCAL key operation when the circuit is connected, or upon detection of certain X.25 network error conditions. The SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence.

Reset Indication (PVC/SVC)

The Reset Indication packet is received by the 3174 as a result of problems detected by the network or the remote DTE. The circuit is stopped, and the error condition is logged with cause and diagnostic codes. The SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence.

Reset Confirmation (PVC/SVC)

The Reset Confirmation packet is transmitted by the 3174 to acknowledge receipt of a Reset Indication packet, or the Reset Confirmation packet may be received by the 3174 in confirmation of a Reset Indication packet.

Restart Request (PVC/SVC)

The Restart Request packet is sent when the 3274 is closing the link due to detecting certain X.25 errors or when a LOCAL key has been accepted. The Restart Request packet is also sent when an open-link operation is performed. Open-link operations are performed when:

- An 3174 IML is performed
- Local mode has been entered and the COMM key is pressed
- The link has been closed because of an error condition.

In this event, the 3174 immediately attempts to open the link. Cause and diagnostic codes are included and logged. When the open-link operation occurs because of error conditions, the codes and the Communication Reminder indicator are displayed.

Restart Indication (PVC/SVC)

When the Restart Indication packet is received, the 3174 responds with a Restart Confirmation packet, shuts down the link, notifies the operator by displaying an indicator with cause and diagnostic codes, and logs the error.

Restart Confirmation (PVC/SVC)

When the 3174 has sent a Restart Request packet as a result of attempting to initialize packet level operation, receipt of a Restart Confirmation packet signals the completion of initialization. The 3174 sends a Restart Confirmation packet whenever a Restart Indication packet is received from the DTE.

Data (PVC/SVC)

The Data packet is used to transmit and receive data once a circuit has been established.

Receiver Not Ready (PVC/SVC)

When the 3174 receives a Receiver Not Ready packet, the 3174 stops transmission until a Receiver Ready is received. The 3174 does not send a Receiver Not Ready packet.

Receiver Ready (PVC/SVC)

The Receiver Ready packet is sent by the 3174 in response to any packet that is received unless an outgoing data packet is ready for transmission. Receipt of a Receiver Ready packet indicates that transmission by the 3174 may continue.

Diagnostic (PVC/SVC)

The Diagnostic packet contains diagnostic information and is received when a reset, clear, or restart packet is not appropriate. The cause and diagnostic information is logged, and no further action is taken.

Switched Virtual Circuit (SVC)

The X.25 SVC capability of the 3174 Establishment Controller permits the operator of an attached 3178, 3278, 3279, or similar display station to connect the 3174 and its attached terminals to a remote host system through an X.25 packet switched network. Note that this capability is not supported on distributed function terminals, such as the 3290 Information Panel.

The functions necessary to connect the 3174 to the remote host are invoked by operator actions at the keyboard (and incoming calls). The status of the 3174 with respect to the network is conveyed to the operator with indicators in the operator information area of the display screen.

To support X.25 SVC functions, additional key functions and indicators are provided at the display. These key functions are a subset of the X.21 Switched feature. The indicators (symbols in the operator information area) are the same as those used in the X.21 Switched feature except that the indicators containing call progress signals in the X.21 feature are redefined and expanded to contain cause and diagnostic codes.

Note: Operator information area indicators are defined in the problem determination guide for your display station.

Key Functions

- Extension Key
- LOCAL key
- LOAD MATRIX key
- DIAL key
- DISC (disconnect) key
- COMM (communication) key

The device attached to port 0 normally has access to the full complement of X.25 Switched function keys. The LOAD MATRIX key function is assigned to port 0 only. The other keys may optionally be assigned to all ports, or certain keys may be deleted, depending on how the 3174 was configured.

See Figure B-2 on page B-12 for details.

Indicators

The following indicators are displayed in the Reminder Area of the operator information area of the display screen:

- Call Ready
- Outgoing Call in progress
- Incoming Call in progress
- Local (Z 599)
- Dial In (dialing terminal)
- Dial In (other terminals, same controller)
- Disconnect in progress
- X.25 Communication Reminder

The following indicator is displayed in the Do Not Enter area:

- Operator Communication Check.

The following indicator is displayed in the Readiness and System Connection area:

- In Use (N).

The following indicator is displayed in the Shifts and Modes area:

- Extension Mode.

X.25 States

- Call Ready — Circuit is in the disconnected state. It is possible to attempt a connection.
- Local— Link and circuit are disconnected. It is impossible to perform a connecting operation.
- In-Use — Circuit is connected and ready for data.
- Incoming Call or Outgoing Call — Connection operation is in progress.
- Disconnection in progress — Disconnection operation is in progress.
- Error — Error states are displayed by the Machine Check and Communication Check indicators.

Normal Operating Procedure

All the X.25 SVC operations are performed using the display station keyboard, screen, and the operation information area of the screen. The indicators that are displayed in the operator information area are defined in the attached display station problem determination guide.

Note: Because there are not enough key positions to execute each X.25 Switched operation by a single keystroke, a key called the Extension key is defined. To execute any of the X.25 function keys (and the LOAD MATRIX key), the sequence is:

1. Press and hold the ALT key.
2. Press the Extension key(>).
3. Release the ALT and Extension keys.
4. Press the desired X.25 function key.

Except for this section, pressing the ALT and Extension keys is not mentioned in this manual. Thus, "press the DIAL key" means press the ALT and Extension keys and press the DIAL key.

When the X.25 function is used, the LOAD MATRIX KEY function is moved from position 38 to position 15.

The X.25 function keys and positions are:

- DIAL key (position 4)
- LOCAL key (position 5)
- COMM (Communication) key (position 6)
- DISC (Disconnect) key (position 8)
- LOAD MATRIX KEY (Load Host Print Matrix; port 0 only) (position 15).

Key layout is defined later in this appendix.

Indicators to show X.25 states are displayed in the Reminder area of the operator information area. The Input Inhibited indicator (X) is displayed per normal 3174 function. The In Use indicator (N) is displayed in location 7 of the Readiness and System Connection Area.

X.25 state indicators disappear while a Communication Check Reminder indicator is displayed.

The Operator Communication Check indicator has a higher priority than the Communication Check indicator and a lower priority than the Machine Check indicator.

Call Ready (SVC only)

- After power is on and the link is operational, the Call Ready indicator is displayed.
- The DIAL key, LOCAL key, or an Incoming Call is accepted when the Call Ready indicator is displayed.

When the DIAL key is pressed in call-ready state, the Dial indicator replaces the Call Ready indicator. The DIAL key initiates keyboard reset and clear functions simultaneously. The reset function restores the keyboard, repositions the cursor to home, returns to the base character set, and restores all input-inhibit conditions except:

- Wait
- Device busy
- Device very busy
- Device not functional
- Security key.

If the keyboard is not reset, the DIAL key performs no function, and extension mode is exited.

The dial screen is displayed. (See "Dial Mode Screen" on page B-19 for a definition of the dial screen.) The appropriate information is entered by the operator.

After the information is keyed in, the ENTER key is pressed. If the data is successfully validated by the 3174, the data entered by the operator is stored, a Call Request packet is assembled and transmitted by the 3174, and the Outgoing Call in Progress indicator replaces the dial indicator.

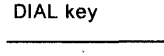
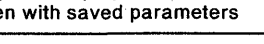
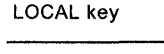
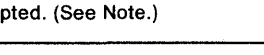
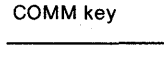
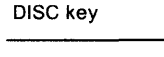
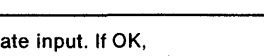
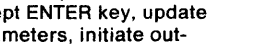
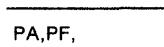
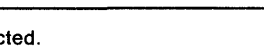
If the ENTER key has not been pressed, or if the entered data was not valid, the information stored by the last successful DIAL/ENTER key operation may be retrieved by pressing the DIAL key again. When dial mode has been entered by a display station, an attempted entry of dial mode at any other display station is inhibited and the Operator Communication Check indicator is displayed.

When in dial mode, the DISC key on other terminals operates normally.

Dial mode operations are shown in Figure B-1 on page B-10.

Pressing the CLEAR key while in dial mode causes the input fields on the screen to be restored from the previously stored values. Once there is no connection with a host application, no AID-generating operation is attempted.

When the online test 0 (/0) is directed to a terminal in dial mode, the dial mode is reset, the call-ready mode is set, the terminal enters test mode, and the test is executed.

Action Taken	Symbol	Dialing Terminal	Symbol	Other Terminals
DIAL key		Accepted. Display Dial screen with saved parameters		Rejected.
LOCAL key		Accepted. (See Note.)		Rejected.
COMM key		Ignored.		Ignored.
DISC key		Accepted. (See Note.)		Accepted. (See Note)
TEST key	TEST	Accepted. Abort Dial In.	TEST or 	Accepted.
ENTER key	 (if ok) (if not ok)	Validate input. If OK, accept ENTER key, update parameters, initiate outgoing call. (See Note.)		Rejected.
CLEAR key		Accepted. Restore Dial-In.		Accepted. Clear screen.
PA,PF, ATTN, SYS REQ keys		Rejected.		Rejected.

Note: This indicator is broadcast to all powered terminals.

Figure B-1. Controller/Terminal Responses in Dial-In State

Data Ready

When the circuit is connected, the Incoming Call or Outgoing Call in Progress indicator is reset and the In Use indicator is displayed in the operator information area.

Disconnection (SVC)

The DISC key is pressed whenever the operator wants to disconnect the circuit. If there are SNA sessions active (bound), the 3174 may have been configured so that the first disconnect sequence results in the display of the Operator Communication Check indicator. This serves as a reminder that there are sessions active.

If the DISC key sequence is reinitiated with no intervening RESET key action, the 3174 initiates a disconnection from the circuit by sending the appropriate Clear Request packet. If the RESET key is used to reset the input-inhibited condition, the entire sequence is reset and the next DISC key operation is also inhibited. DISC keys pressed when no sessions are active initiate an immediate disconnection.

A configuration option is provided that allows the DISC key to immediately initiate a disconnection regardless of the status of the LU sessions.

Also, any Clear Indication packet received by the 3174 initiates a circuit disconnection and causes the 3174 to send a Clear Confirmation packet. The cause and diagnostic codes from the Clear Indication packet are displayed in the operator information area.

The disconnect-in-progress state is entered when the DISC key operation is accepted, when a QDISC packet is received, or when the station is closed because of detected SNA-level errors.

The Call Ready indicator replaces the Disconnect in Progress indicator when the line is successfully disconnected. If not in dial mode, the screen is unchanged. If in dial mode, the dialing terminal's screen is cleared and disconnect-in-progress state is entered. Sessions are reset if they exist, and all session-related indicators, including Online, Ownership, System, and Wait are reset.

The In Use indicator is turned off when disconnection is completed. A new Call Request packet is required to reestablish the connection.

Cause and Diagnostic Indicators

Cause and Diagnostic indicators are displayed in the operator information area to aid in user problem determination for abnormal disconnection. They are displayed with the Call Ready indicator when cause and/or diagnostic codes are received by or transmitted from the 3174 because of an error condition. They are not displayed when the 3174 operator causes a normal disconnect through the DISC key function. Cause and diagnostic codes are also displayed with the X.25 Communication Reminder indicator and indicate the cause and diagnostic codes from a Restart/Reset/Clear packet transmitted or received from the 3174.

Note: These codes are CCITT-recommended and IBM-architected. However, these codes may not apply, nor be common, to all networks.

Incoming Call

Incoming Call Request packets are accepted in call-ready state, and the Incoming Call in Progress indicator is displayed. This indicator is reset when the circuit is connected.

Local Mode

In local mode, incoming calls and all outgoing requests are rejected. The 3174 is disconnected from the link.

The LOCAL key is accepted in the call-ready state and the Local Mode indicator is displayed on all the display station screens.

The COMM key is pressed to reset local mode. The call-ready state is entered, and the link is initialized.

Exceptional Case Handling

The operator should take action as follows:

1. Call Ready indicator with C&D codes or X.25 Communication Reminder

   For a dial request, this indicator means the request has failed with the network reason specified by the C&D codes. In all cases, the operator should consult the appropriate manual for a recommended recovery action for each C&D code.

2. Communication Reminder indicator while in X.25 SVC mode:

   An operator can retry the call, if appropriate, and can determine the state of the connection by the In Use indicator. If the In Use indicator is not displayed, the COMM key can be used to reset the Communication Reminder indicator. The X.25 keys that are allowed in a particular X.25 state (that is, do not result in display of the Operator Communication Check indicator) reset the Communication Reminder indicator. If the error persists, the problem determination manual procedures identified by the particular status code should be followed. See the *3174 Status Codes* manual.

3. Machine Check.

This means an error was detected in the 3174 subsystem. The same action as for the base 3174 should be followed.

No unique machine-check numbers are generated.

X.25 SVC States and Key Operation

This section defines how to treat a key when it is pressed in X.25 SVC-specific states. Figure B-2 on page B-12 summarizes these key operations.

In this section, keys other than the following are called "Other" keys:

- DIAL, LOCAL, DISC, and COMM keys
- AID keys (The ATTN key is treated in the same way as the AID keys in this section.)
- TEST key
- SYS REQ key (The SYS REQ key is treated as in the base machine.)

	Operation		
Status	DIAL Key Pressed	ENTER Key Pressed (Dial In complete)	DISC Key Pressed
Call Ready	Accepted. [1] or	Accepted.	Ignored.
Call Ready with C&D Codes	Accepted. [1] or	Accepted.	Accepted. [2]
Outgoing Call in Process	Rejected.	Rejected.	Accepted.
Incoming Call in Process	Rejected.	Rejected.	Accepted.
Data Ready	Rejected.	Rejected.	Accepted.
Disconnect in Process	Rejected.	Rejected.	Ignored.
Local	Rejected. 599	Rejected. 599	Rejected. 599
X.25 Communication Reminder	Rejected. XCCDD	Rejected. XCCDD	Rejected. XCCDD

[1] *See Figure C-2 for indicators displayed by Dialing terminal and Other terminals.*
[2] *Reset cause and diagnostic (C&D) codes.*

Figure B-2 (Part 1 of 3). Key Operations during X.25 States

	Operation		
Status	LOCAL Key Pressed	AID Key Pressed	COMM Key Pressed
Call Ready	Accepted.	Rejected.	Ignored.
Call Ready with C&D Codes	Accepted.	Rejected.	Accepted. [4]
Outgoing Call in Process	Rejected.	Rejected.	Ignored.
Incoming Call in Process	Rejected.	Rejected.	Ignored.
Data Ready	Rejected.	Same as base machine.	Ignored.
Disconnect in Process	Rejected.	Rejected.	Ignored.
Local	Ignored. 599	Rejected. 599	Accepted. 506
X.25 Communication Reminder	Accepted. 599	Rejected. XCCDD	Rejected. XCCDD

[3] *Reset Operator Communication Check indicator*
[4] *Reset C&D codes.*

Figure B-2 (Part 2 of 3). Key Operations during X.25 States

Status	Operation								
	Extension Key Pressed	TEST Key Pressed	PA Key Pressed	PF Key Pressed	ATTN Key Pressed	SYS REQ Key Pressed	DATA Key Pressed	LOCAL Key Pressed	CLEAR Key Pressed
Print ID	Abort Print ID. ▶	Abort Print ID. TEST	Abort Print ID. ✖?+	Abort Print ID. ✖?+	Abort Print ID. ✖-f	Abort Print ID. Accepted.	*Not* Aborted Data Key = Numeric: Printer Status Alpha: Printer Status ALPHA	*Not* Aborted Accepted.	Abort Print ID. ✖?+
Dead-key operation in process	Abort Dead key. ▶	Abort Dead key. TEST	See Note ✖+?	See Note ✖+?	Accepted.	Accepted.	a,e,i,o,u Accepted. *Not* a,e,i,o,u ✖+? See Note	Accepted.	See Note ✖+?
X.25 Communication Reminder	Accepted. ▶	Enter Test mode. TEST	✖-f XCCDD				Accepted.	✖	Accepted.

▶ = Extension

See Figure C-2 for Indicators displayed by Dialing terminal and Other terminals.

Note: Accent symbols shown (') may be any valid accent symbols, for example, ' , . ^

Status	Operation			
	Extension Key Pressed	TEST Key Pressed	PA, PF, ATTN or SYS REQ Key Pressed	DATA Keys, LOCAL Key, or CLEAR Key Pressed
Extension	Exit Extension mode.	Exit Extension mode. ✖?	Exit Extension mode. ✖?	Exit Extension mode. ✖?
Dial	Accepted. ▶	Abort Dial In.[5] TEST	Rejected.[5] ✖-f ##? or ##	Accepted.[5] ##? or ##
Test	✖-f TEST	Exit Test mode.	✖-f TEST	Accepted. TEST

▶ = Extension

[5] *See Figure C-2 for indicators displayed by Dialing terminal and Other terminals.*

Figure B-2 (Part 3 of 3). Key Operations during X.25 States

Indicators

Call Ready

While the Call Ready indicator is displayed:

- DIAL, LOCAL, TEST, and "Other" keys are accepted.
- DISC and COMM keys are ignored.
- AID keys are rejected with 'X−f' indicator.

If the C&D codes are displayed with the Call Ready indicator:

DISC and COMM keys clear the C&D codes, and all the "Other" keys are treated in the same way as above.

Dial In

While the Dial In indicator is displayed:

At Dial-Originating Station:

- DIAL, LOCAL, DISC, TEST,* ENTER, and "Other" keys are accepted.
- COMM key is ignored.
- Aid keys (except ENTER and CLEAR) are rejected with 'X−f' indicator.

*TEST key aborts the dial-in mode.

At Other Stations

- DIAL and LOCAL keys are rejected with Operator Communication Check Indicator.
- DISC key is ignored.
- COMM key is ignored.
- TEST key and "Other" keys are accepted.
- AID keys are rejected with 'X−' indicator.

Outgoing Call in Progress

While Outgoing Call in Progress indicator is displayed:

- DISC, TEST, and "Other" keys are accepted.
- DIAL AND LOCAL keys are rejected with Operator Communication Check indicator.
- COMM key is ignored.
- AID keys are rejected with 'X−f' indicator.

Incoming Call in Progress

While Incoming Call in Progress indicator is displayed:

- DISC, TEST, and "Other" keys are accepted.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- COMM key is ignored.
- AID keys are rejected with 'X−f' indicator.

Data Ready (In Use)

The In Use indicator is displayed in location 7. No indicator is displayed in the Reminder area when the virtual circuit connection with the X.25 network has been established.

- AID, TEST, DISC, and "Other" keys are accepted.
- DISC and COMM keys are ignored.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with 'X−f' indicator.

Disconnect in Progress

While the Disconnect in Progress indicator is displayed:

- TEST and "Other" keys are accepted.
- DISC and COMM keys are ignored.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with 'X−f' indicator.

Local

The Communication Reminder indicator with the number of '599' is displayed in local mode and:

- COMM, TEST, and "Other" are accepted.
- LOCAL key is ignored.
- DISC and DIAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with 'X−f' indicator.

X.25 Communication Reminder Indicator

The X.25 Communication Reminder indicator is displayed when the link is closed because of the transmission or receipt of a restart packet. In SVC applications, it is replaced with the Call Ready indicator with C&D codes when the link has been successfully opened. While the Communication Reminder indicator is displayed, all X.25 keys, except LOCAL, are rejected with the Operator Communication Check indicator displayed. The LOCAL key puts the 3174 in local mode.

In PVC connections, the indicator is displayed until the circuit is successfully reopened.

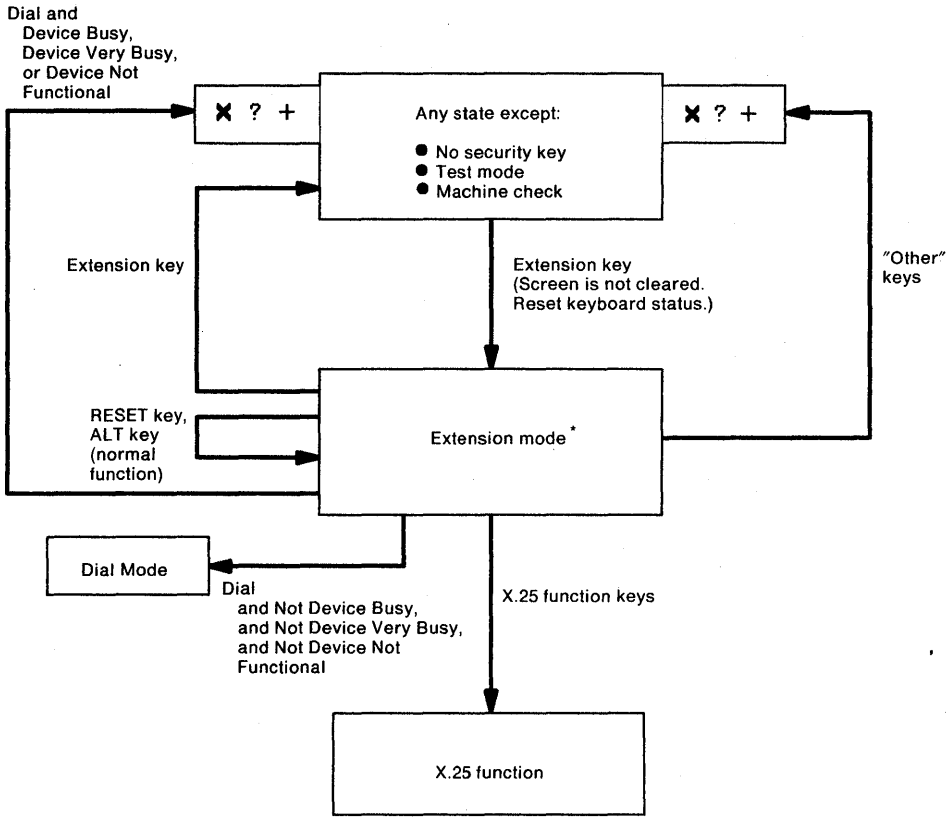
Extension Key

Extension Mode

Extension mode is defined to create additional key functions for X.25 Switched operation on the keyboards of 3178, 3278, 3279, and other compatible attached display stations.

1. Extension mode is entered at any time, except during test mode, a machine check, or a no-security-key condition, by pressing the Extension key.
2. '>' is displayed in the Shifts and Modes area of the operator information area while in extension mode.
3. Pressing the Extension key while in extension mode resets extension mode.
4. The RESET key operates normally in extension mode but does not reset extension mode.
5. The ALT key is treated as a NOP (ignored).
6. While in extension mode at an authorized display station, if any X.25 key other than LOAD MATRIX, ALT, or RESET is pressed, the Retry indicator is displayed and extension mode is reset.
7. When online test 0 (/0) is directed to a terminal in extension mode, extension mode is reset, the terminal enters test mode, and the test is executed.
8. When extension mode is exited, the shift indicators are restored to the state they were in before the Extension key was pressed.
9. Pressing the Extension key is ignored when the terminal is attached to a 3174 port that is not configured to support the Extension key function.

Figure B-3 summarizes extension mode.



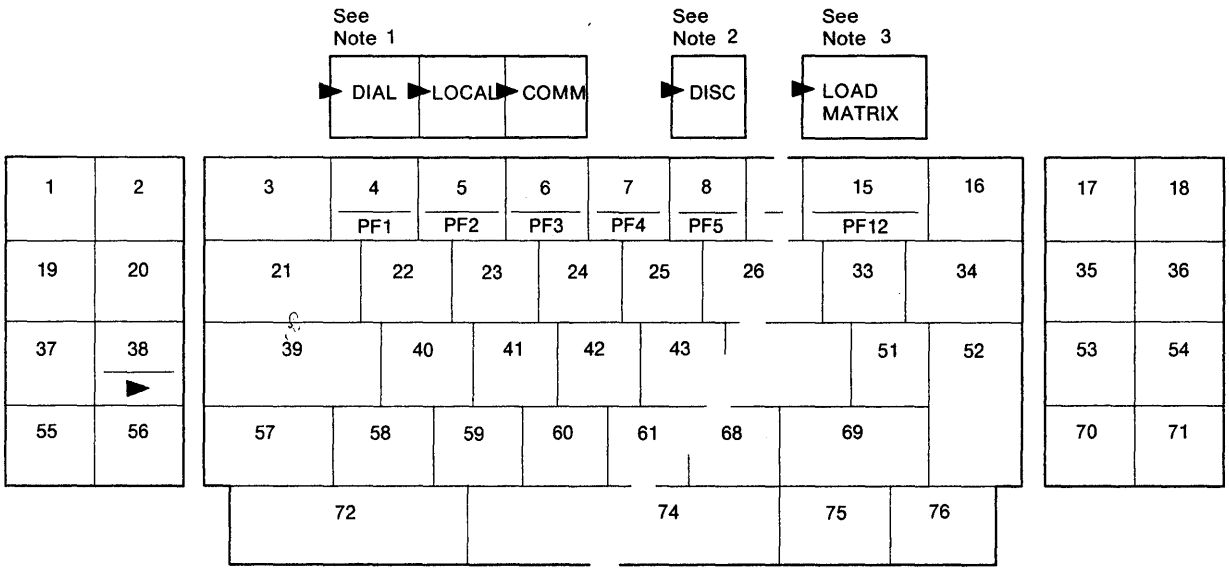
Indicate '►' in the shift status field of the operator information area.

Figure B-3. Extension Mode Definition

Extension Key and X.25 Function Keys

Figure B-4 defines key positions for the Extension key and the X.25 function keys.

Note: These key functions are available on attached 3278s, 3279s, and similar display stations. They are not available on distributed function terminals, such as a 3290 Information Panel.



► *Label (decal) on keyface identifies Extension key.*

Notes:

1. *Each of these labels (decals) is applied by the customer to the display station keyboard. The labels are applied as shown next to the key that assumes the corresponding X.25 function following the pressing of the Extension key.*
2. *The DISC key is separated from the other keys by at least one key space to prevent its being pressed in error.*
3. *The LOAD MATRIX key function is available only at a display station attached to port 0 of the control unit.*

Figure B-4. Extension Key and X.25 Function Keys

Dial Mode Screen

Figure B-5 shows the layout of the display screen when dial mode is entered. The screen displays the dial number and the other facility control fields set to the defaults as selected during configuration (or as overridden by the operator with a previous dial operation).

Any values that require change can be updated by the operator. When the screen contains the correct values, the ENTER key is pressed to initiate appropriate action by the 3174.

A configuration option is provided either to display HNAD only or to display all fields shown below on the dial screen. The default is to display HNAD only.

The cursor is initially positioned in the first character location of the HNAD input field.

```
HNAD              = @123          123   789    @

CID               = @A1500000@
NPKT              = @1@
NWND              = @07@
RPOA              = @1898@
CUG               = @32@
QLLC              = @1@
TCLS              = @9@
DPKT              = @1@
DWND              = @02@
OOPT              = @000000000@
IOPT              = @000000000@
I/O               = @0@
```

Figure B-5. Dial Mode Screen

Where: @ @ delineates an entry field, the rest of the screen is protected. Entry is validated. If the number or value is invalid, Input Inhibited and Wrong number indicators are displayed and the cursor is positioned in the first character location of the invalid field.

The input fields shown in Figure B-5 are defined as follows:

HNAD

- This 15-character field contains the host network (DTE) address.
- The initial value of this field is set during the configuration procedure (question 423).

Note: A configuration option is provided to inhibit display of the following fields. If this configuration option is used, the dial mode screen will contain only the HNAD field. Display HNAD field only is the default for the configuration option.

CID

- This field contains the CID (connection identifier or network password).
- Input is validated to be 0 – 9, A – F, blank, or nulls.
- For security, this is a nondisplay field.
- The value of this field may be preset during the configuration procedure (question 452).

NPKT

- This field contains the packet size to be negotiated toward.
- The value of this field is preset during the configuration procedure (question 430).

NWND

- This field contains the window size to be negotiated toward.
- The value of this field is preset during the configuration procedure (question 432).

RPOA

- This field contains the recognized private operating agency (RPOA) facility ID and is used to select the intermediate network that is to be used between two public networks.
- RPOA may be preset during the configuration procedure (question 442).

CUG

- This field allows the closed user group (CUG) facility to be included in an outgoing Call Request packet.
- CUG may be preset during the configuration procedure (question 441).

QLLC

- This field defines whether QLLC (Qualified Logical Link Control) or PSH (Physical Service Header) logical link control protocols are used. QLLC is to be used by all "new" IBM products with integrated X.25 support. PSH support will allow the 3174 to communicate with "old" X.25 equipment, namely, the equipment attaching to the network through the Network Interface Adapter (NIA) box.
  0 = PSH
  1 = QLLC
- Logical link control may be preset during the configuration procedure (question 403).

TCLS

- This field defines the Throughput Class value which the 3174 is to use in throughput class negotiation.
- TCLS may be preset during the configuration procedure (question 440).

DPKT

- This field contains the default packet size.
- The value of this field is preset during the configuration procedure (question 434).

DWND

- This field contains the default window size.
- The value of this field is preset during the configuration procedure (question 435).

OOPT

- This field allows the operator to override the outgoing call options selected during the configuration procedure (question 421).
- If the circuit type (question 401) specified during configuration is incoming call only, this field is not displayed.

IOPT

- This field allows the operator to override the incoming call options (question 420) specified during the configuration procedure.
- If the circuit type (question 401) specified during configuration is outgoing call only, this field is not displayed.

I/O

- If the circuit type (question 401) specified during configuration was a two-way call, this input field allows the operator to indicate whether the information on the dial screen should be used (when the ENTER key is pressed) to:
  1. Initiate an outgoing call (value = 0), or
  2. Only store the (changed) values either to allow an incoming call or as future reference for an outgoing call (value = 1).
- If the circuit type (question 401) specified during configuration is incoming call only or outgoing call only, this field is not displayed.

Permanent Virtual Circuit (PVC)

PVC Indicators

An additional indicator is required to convey the network or 3174-supplied cause and diagnostic codes that accompany reset or restart packets. These codes provide the reason for the link's being closed. This indicator is called the X.25 Communication Reminder. When a PVC circuit has been connected, the In Use indicator is displayed in the operator information area.

Note: The operator information area cause codes and diagnostic codes are described under "X.25 Cause and Diagnostic Codes" on page B-24.

PVC Keys

Only two of the keys defined earlier in this appendix, "X.25 SVC States" and "Key Operations," are provided for PVC connections. They are the LOCAL and COMM keys. Optionally, the function of these keys may be deleted from the 3174 through configuration.

LOCAL Key

The LOCAL key allows a display operator to disconnect the 3174 from the X.25 link. When the LOCAL key is pressed, the 3174 determines whether any SNA sessions are active. The 3174 may have been configured so that, if there are no sessions active, the 3174 will immediately initiate a close-link sequence. If there are SNA sessions active, the Operator Communication Check and Input Inhibited indicators are displayed. If the LOCAL key is pressed a second time without the RESET key being depressed, the close-link sequence is initiated. If the RESET key is pressed to restore the keyboard, two consecutive LOCAL key sequences are required. A configuration option is provided that allows the first pressing of the LOCAL key to always perform the close-link sequence. The initiation of a close-link sequence displays the Local indicator.

COMM Key

Pressing the COMM key when in local mode causes the 3174 to display status code 506 (may only be displayed for a split second and not be seen by the operator) and it tries to reopen the link and circuit. When not in local mode, the COMM key is ignored.

Summary of States and Indicators

Primary Virtual Circuit

Figure B-6 provides a summary of PVC states and indicators.

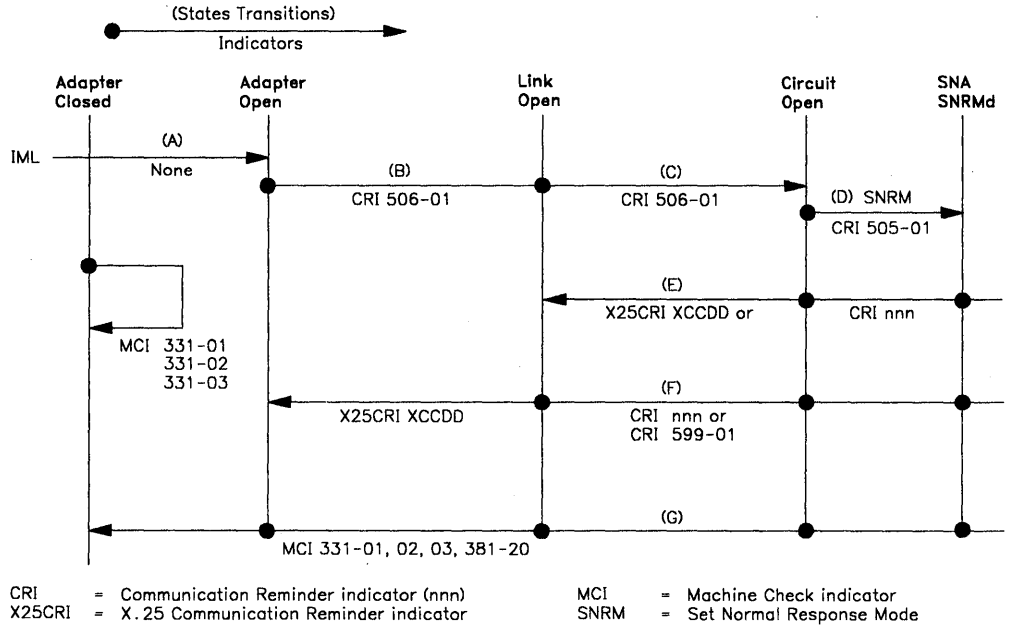


Figure B-6. PVC States and Indicators

Switched Virtual Circuit

Figure B-7 provides a summary of SVC states and indicators.

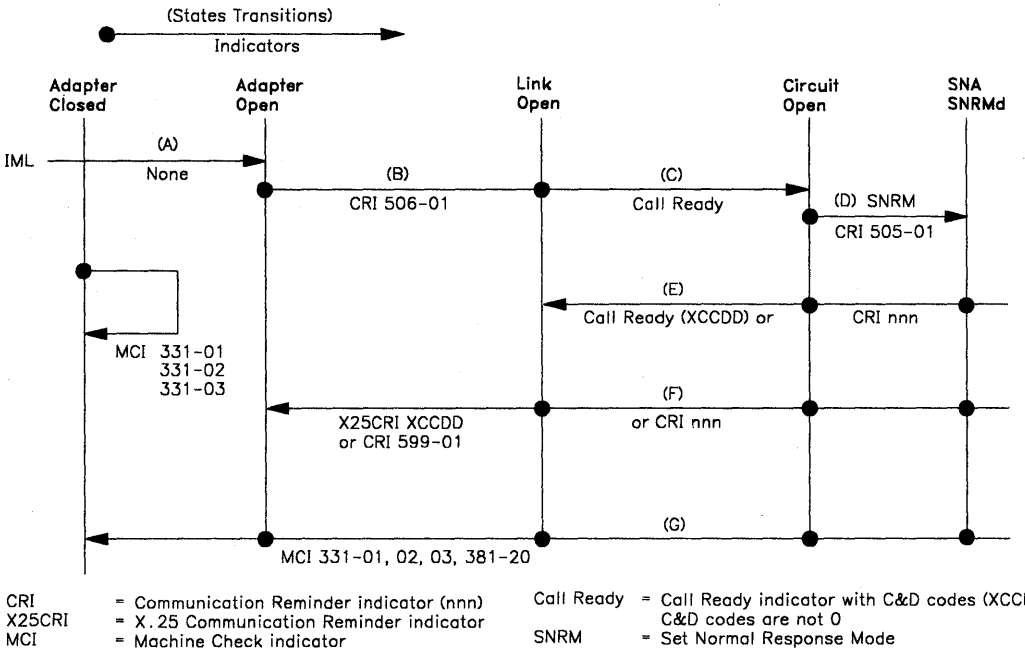


Figure B-7. SVC States and Indicators

X.25 Cause and Diagnostic Codes

This section defines the following X.25 cause and diagnostic codes.

Note: Networks may use their own values for the cause and diagnostic codes. The ones shown in the figures in this section are taken from the November 1980 CCITT recommendation for X.25 networks.

Cause Codes

Clear Indication Packet

Table B-2 lists the cause codes received from data circuit-terminating equipment (DCE) for a Clear Indication packet.

Table B-2. Cause Codes Received from DCE (Clear Packet)	
Hex Code	**Meaning**
00	DTE-originated[1]
01	Number busy
03	Invalid facility request
05	Network congestion
09	Out of order
11	Remote procedure error
13	Local procedure error
15	RPOA out of order
19	Reverse-charging acceptance not subscribed
21	Incompatible destination
29	Fast-select acceptance not subscribed
0B	Access barred
0D	Not obtainable

[1] When the cause code is X'00', the diagnostic code field has been passed through the network from the remote DTE's original Clear Request. The diagnostic code is then as listed in Table B-6 on page B-27, provided the remote DTE is an IBM (SNA) DTE.

Reset Indication Packet

Table B-3 lists the cause codes received from data circuit-terminating equipment (DCE) for a Reset Indication packet.

Table B-3. Cause Codes Received from DCE (Reset Packet)	
Hex Code	**Meaning**
00	DTE-originated
01	Out of order[1]
03	Remote procedure error
05	Local procedure error
07	Network congestion
09	Remote DTE operational[2]
11	Incompatible destination
0F	Network operational[2]

[1] When the cause code is X'00', the diagnostic code field has been passed through the network from the remote DTE's original Clear Request, Reset Request, or Restart Request Packet. The diagnostic code is then as listed in Table B-6 on page B-27, provided the remote DTE is an IBM (SNA) DTE.

[2] Applicable to permanent virtual circuits only.

Restart Indication Packet

Table B-4 lists the cause codes received from data circuit-terminating equipment (DCE) for a Restart Indication packet.

Table B-4. Cause Codes Received from a DCE (Restart Packet)

Hex Code	Meaning
01	Local procedure error
03	Network Congestion
07	Network operational

Diagnostic Code Modifiers

Table B-5 lists the diagnostic code modifiers.

Table B-5. Diagnostic Code Modifiers

Hex Code	Meaning
00	No additional information provided. See diagnostic code.
01	Calling DTE address is expected, but none is included.
02	Calling DTE address does not match configured value.
03	Facilities other than RPOA are included when configuring indicates that none is expected.
04	Reserved.
05 *	Packet facility is included but is not configured.
06	Incoming CUG does not match configured value.
07	Call requests reverse charging, but the function is not configured.
08	Call requests reverse charging not requested, but the function is not configured.
09 *	Call included window size facility, but the window size facility is not configured.
10	CID is to be validated, but none is included in the Call Request packet.
11	CID is included but does not match the configured value.
12	Protocol ID is not included.
13	Protocol ID is incorrect.
14	CUG facility is configured but is not included in the Call Request packet.
15	Throughput class facility is configured but not included.
16	Reserved.
17	Reverse-charge facility is configured but not included.

* Configured = Either configured value or value entered from the Dial screen.

Diagnostic Codes from DCE

Table B-6 lists the diagnostic code fields received from data circuit-terminating equipment (DCE).

Table B-6. Diagnostic Code Fields Received from DCE

Hex Code	Meaning
00	No additional information
01	Invalid P(S)
02	Invalid P(R)
10	Packet type invalid — general
	For state:
11	R1
12	R2
13	R3
14	P1
15	P2
16	P3
17	P4
18	P5
19	P6
1A	P7
1B	D1
1C	D2
1D	D3
20	Packet not allowed — general
21	Unidentifiable
22	Call on one-way logical channel
23	Invalid packet type on PVC
24	Packet on unassigned logical channel
25	Reject not subscribed to
26	Packet too short
27	Packet too long
28	Invalid GFI
29	Restart with nonzero GFI
2A	Packet type incompatible with facility
2B	Unauthorized interrupt confirmation
2C	Unauthorized interrupt
30	Timer expired — general
31	Incoming call
32	Clear indication
33	Reset indication
34	Restart indication
40	Call setup problem — general
41	Facility code not allowed
42	Facility parameter not allowed
43	Invalid called – address
44	Invalid calling – address
50	Call clearing problem — general
51	Nonzero address lengths field
52	Nonzero facility lengths field

Diagnostic Codes from DTE

Table B-7 lists the diagnostic code fields generated by IBM (SNA) data terminal equipment (DTE).

Table B-7 (Page 1 of 2). Diagnostic Code Fields Generated by IBM (SNA) DTE

Hex Code	Meaning
00	Normal initialization or termination
0C	Invalid LLC type
10	Invalid Packet type — general
	For state:
11	R1
12	R2
13	R3
14	P1
15	P2
16	P3
17	P4
18	P5
19	P6
1A	P7
1B	D1
1C	D2
1D	D3
20	DCE timer expired — general
21	Incoming call
22	Clear indication
23	Reset indication
24	Restart indication
30	DTE timer expired — general
31	Call request
32	Clear request
33	Reset request
34	Restart request
50	QLLC error — general
51	Undefined C-field
52	Unexpected C-field
53	Missing I-field
54	Undefined I-field
55	I-field too long
56	QFRMR received
57	Invalid QLLC header
58	Data received in non-data state
59	Timeout condition
60	PSH error — general
61	Sequence error
62	PS header too short
63	PSH format invalid
64	Command undefined
65	Invalid PSH protocol
66	Data received in non-data state
69	Timeout condition
A0	Packet not allowed

Table B-7 (Page 2 of 2). Diagnostic Code Fields Generated by IBM (SNA) DTE

Hex Code	Meaning
A1	Invalid M-bit packet sequence
A2	Invalid packet type received
A3	Invalid packet on PVC
A4	Unassigned logical channel number
A5	Diagnostic packet received
A6	Packet too short
A7	Packet too long
A8	Invalid GFI
A9	Not identifiable
AA	Not supported
AB	Invalid P(S)
AC	Invalid P(R)
AD	Invalid D bit received
AE	Invalid Q bit received
	3174 – specific codes (see Note)
C1	Termination pending
C2	Channel inoperative
C3	Unauthorized interrupt confirmation
C4	Unauthorized interrupt request
C5	PVC resource not available
D0	Resources — general
D1	Buffers depleted
D2	PIU too long
E0	Local procedure error — general
E1	Packet received with LC not equal to 0
E2	Restart or Diagnostic packet received with LC not equal
E3	to 0
E4	Incoming call received on wrong LC
E5	Facility not subscribed
E6	Invalid packet for LC equal to 0
E7	Facility parameters not supported
E8	Facility not supported
E9	Unexpected calling DTE
EA	Invalid D bit received
EB	Reset indication on virtual call
EC	Invalid protocol identifier
	Connection identifier mismatch
F0	Remote procedure error—general

Note: The 3174 uses this list of diagnostic codes regardless of the type of circuit.

Appendix C. X.21 Feature

The Type 2 Communication Adapter and Type 2 Concurrent Communication Adapter in the 3174 Establishment Controller enables the 3174 to be attached to a DCE that operates as specified in CCITT Recommendation X.21 at speeds of 2400, 4800, 9600, 48 000, and 64 000bps.

To use the X.21 Switched feature, the 3174 must have either a 3278, 3279, or similar display station attached.

X.21 Functional Description

The 3174 supports the following X.21 functions:

- SDLC microcode to support X.21 Switched protocol
- Data link control, which is an interface to the SDLC microcode
- X.21 Switched adapter (Type 2 Communication Adapter).

The data link control issues function requests to the microcode and handles completion codes from the microcode. Figure C-1 on page C-3 outlines the data link control function.

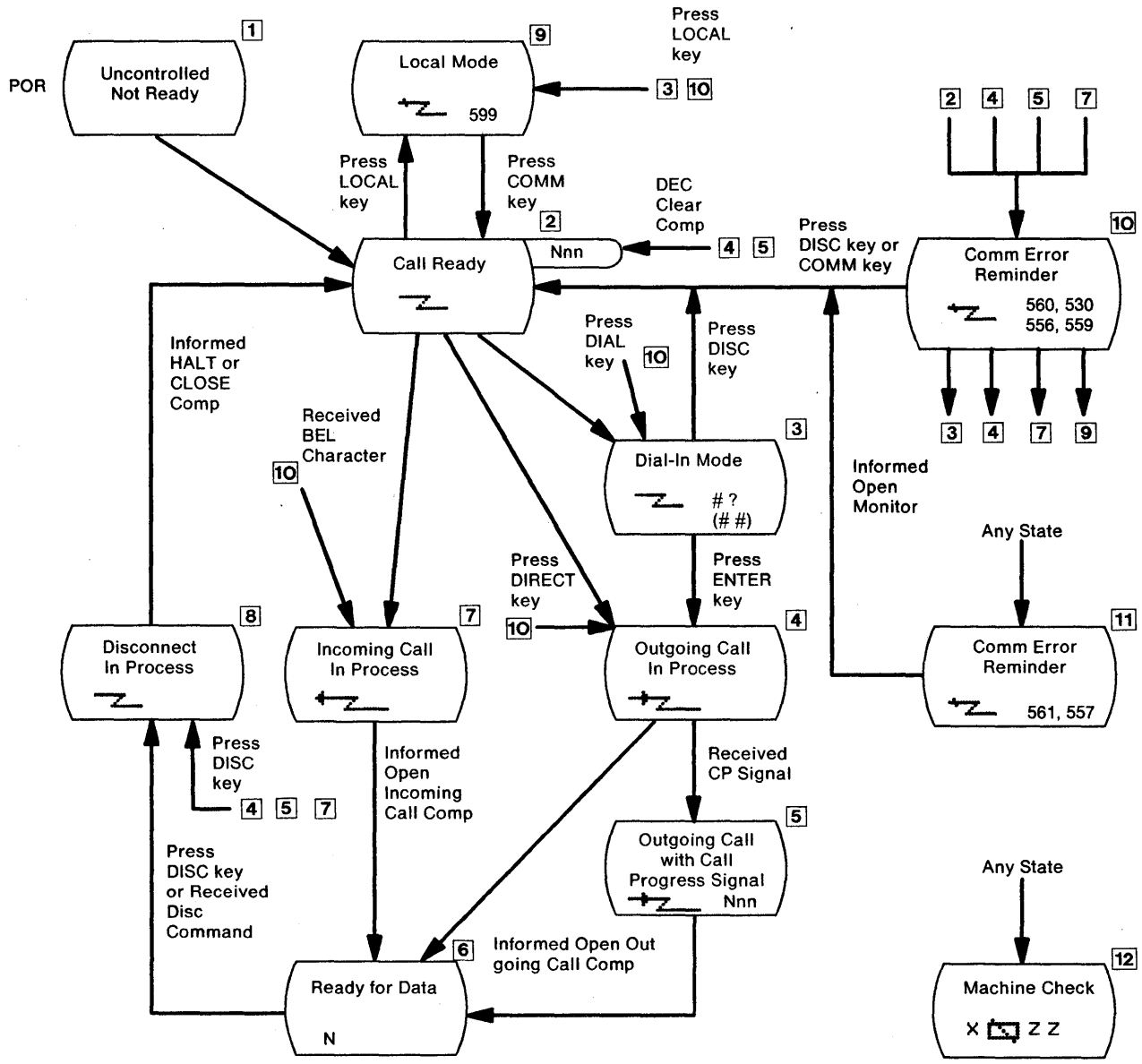


Figure C-1. Data Link Control Function

X.21 Switched Microcode Function

Function Requests

1. OPEN for outgoing call.

   By this request, the HPCA and the X.21 hardware are reset and enabled. After passing through the ready state, they proceed with the outgoing call establishment.

   The microcode signals the X.21 hardware to enter the call-request state and awaits the reception of an IA5 plus (+) character from the network.

   When the request contains selection signals, the microcode/X.21 hardware sends two IA5 sync characters and the selection signals (including 'dial digits') that were set up by the data link control in the selection signal buffer.

   The X.21 hardware monitors the network interface; if 'call progress' signals and/or called line identification are received, they are passed on to the microcode. After translation, the microcode will

pass the first 'call progress' signal (normally two digits) or line ID to the data link control's buffer and posts an intermediate completion status.

When the microcode detects that the network is ready for data, the microcode will enter the data-transfer phase after housekeeping and preparing the X.21 hardware and microcode to receive the first SDLC frame. The data link control is notified that the Open is completed.

The process is similar when outgoing call is direct. A direct call by the data link control identifies a direct call by specifying no dial digits. When the IA5 plus (+) character is received, signifying select from the network, the microcode enters the DTE waiting state for the reception of 'call progress' signals, called line identification (the indication that the network is ready for data).

2. OPEN for incoming call.

   When the data link control issues the X.21 Open function request for an incoming call, the action of the microcode/X.21 hardware differs slightly from that for an outgoing call.

   - The microcode/X.21 hardware determines that the network is ready, then enters the ready state to wait for an interrupt from the X.21 hardware signifying activity on the network.
   - Receipt of one IA5 BEL character identifies the incoming call state. The microcode posts an intermediate completion status/IA5 (BEL RCVD), and when it regains control, prompts the X.21 hardware to turn on the control lead that signifies the call-accepted state.
   - The microcode now waits for an interrupt to indicate either that the calling line identification has been received or that the network is ready for data. If line identification is received, the microcode moves it to the data link control's buffer, and the completion status is passed on in the same way as for an outgoing call.

   When the ready-for-data condition is detected, the data-transfer phase is entered after the microcode completes appropriate housekeeping and prepares the X.21 hardware for the first SDLC frame. A normal completion to the Open function request is posted by the microcode.

3. Open for monitoring

   The microcode checks the X.21 interface periodically. If the DCE's status coincides with the condition specified by the data link control, that is, DCE ready or DCE not ready, the microcode reports normal completion.

4. Close

   If the clearing sequence is already completed, the microcode merely executes the final housekeeping requirements; otherwise, the microcode starts a clearing sequence. When the clearing sequence ends properly, and no comparator error is indicated by the X.21 hardware, a normal completion is posted. When the clearing sequence does not end properly within its time limit, or if a comparator error exists, appropriate error status is posted. The HPCA and the X.21 hardware are always reset prior to posting any completion code to the Close FR. The microcode/X.21 hardware will be in the controlled-not-ready state when this FR ends.

5. HALT

   The data link control aborts an Open function request by issuing a HALT request. The microcode executes a clearing sequence to the network.

Call Collision

A call-collision condition can exist when a call request is made to the network at the same time the network is making an incoming call. The network will resolve the collision in favor of the call request.

Note: The X.21 recommendation does not permit deliberate call collisions; that is, the DTE entering the call-request state after becoming aware of the incoming-call state.

Therefore, the data link control avoids deliberate situations by issuing the proper sequence of function requests, for example, by issuing a HALT request to the Open for Incoming request before issuing the Open for Outgoing request.

Call Progress (CP) Signals

The only time the microcode is affected by a particular 'call progress' (CP) signal is if the first digit of a received CP signal is an IA5 0, 2, or 6.

The IA5 0 identifies the call-wait class (terminal called or waiting connection). The action of the microcode upon detecting the (IA5 0) is to initiate a 60-second timeout, instead of the 2-second timeout, while waiting for the network to become ready for data. Upon detecting the IA5 2 or 6 (short-term condition when clearing), the microcode prepares for the retry by initiating a clearing sequence. CP signals already received will be moved to the data link control's buffer.

When reacting to an IA5 '0' CP, the microcode will post the intermediate completion status, indicating that CP signals are available in the buffer. When reacting to the IA5 '2' or '6' CP, the retry intermediate status is posted, indicating the retry is due to receipt of a retry type CP signal.

Data Link Control Function

Call Ready

The Call Ready indicator is displayed in the operator information area of the 3278 or 3279, and the use of either the DIAL key or the LOCAL key is accepted, as is an incoming call.

This state is the *X.21 ready* state and is entered by the Open for Incoming request to the microcode under the following conditions:

1. Immediately after the 3174 is powered on by the uncontrolled-not-ready state.
2. When the COMM key is pressed while operating in the local mode.
3. When the dial-in mode is ended by the DISC key.
4. After the line is disconnected normally by the DISC key on the DISC command.
5. When the Open Outgoing request is rejected by CP signals.
6. After the line is disconnected by an error, or after the X.21 open request is completed erroneously, except if condition 7 exists. (The Call Ready indicator is overridden by the communication error reminder. This reminder can be reset by the COMM key, and the Call Ready indicator will appear.)
7. If the DCE is not ready, the communication error reminder is displayed, and the Open Monitor request is issued. When this request is completed, the Call Ready indicator is displayed in the operator information area.

Incoming Call in Progress

When an incoming call comes to the 3174 while in the X.21 ready state, the microcode returns the intermediate completion code with 'BEL RCVD'. The data link control displays the Incoming Call in Progress indicator and returns control to the microcode. When the Ready for Data is sent from the DCE, the microcode returns a normal completion code. The data link control turns off the Incoming Call in Progress indicator, turns on the In Use indicator, and prepares for normal data exchange.

Dialing

When the DIAL key is pressed in the call-ready state, the data link control issues the HALT request to the microcode to inhibit an incoming call, clears the screen, and puts the cursor at the home position. The Wait indicator is displayed until the HALT request is completed. Then the Dial In indicator is displayed.

The operator enters dial digits, or any facility request allowed by the network, and presses the ENTER key.

The data link control issues an Open-for-Outgoing request to the microcode with parameters that include selection signals entered by the operator and displays the Outgoing Call in Progress indicator.

Direct Call

When the DIRECT key is pressed in the call-ready state, the data link control issues the HALT request and the Open-for-Outgoing request with no selection signal and displays the Outgoing Call in Progress indicator.

Outgoing Call in Progress

The microcode processes the Open-for-Outgoing request, as described under "X.21 Switched Microcode Function" on page C-3, and returns a normal completion code to the data link control when the X.21 'ready for data' signal is sent from the DCE. The data link control turns off the Outgoing Call in Progress indicator, turns on the In Use indicator, and prepares for normal data exchange.

Local Mode

When the LOCAL key is pressed in the call-ready state, the data link control issues the HALT request and displays the Local Mode indicator.

The local mode is the X.21 controlled-not-ready state and inhibits incoming and outgoing calls.

When the COMM key is pressed in local mode, the data link control issues an Open for Incoming request to the microcode and displays the Call Ready indicator.

Disconnection

When the DISC key is pressed in the ready-for-data state or outgoing/incoming call-in-progress state, the data link control issues a CLOSE request in the ready-for-data state, or issues a HALT request in the outgoing/incoming call in progress state to the microcode, and displays the Disconnect in Progress indicator. When the close completion code is returned from the microcode, the data link control turns off the In Use indicator, issues an Open for Incoming request to the microcode, enters the call ready state, and displays the Call Ready indicator. When the halt-completion code is returned, the data link control issues an Open for Incoming request to the microcode, enters the call-ready state, and displays the Call-Ready indicator.

The line is also disconnected automatically by a timeout condition or by the SDLC DISC command.

Status and Key Operation

Figure C-2 and Figure C-3 on page C-8 show how keys are treated when pressed in the X.21 Switched states and when in the dial-in mode.

	Operation					
Status	DIAL Key Pressed	DIRECT Key Pressed	DISC Key Pressed	LOCAL Key Pressed	COMM Key Pressed	AID Key Pressed
Call Ready	Accept	Accept	Ignore	Accept	Ignore	
Call Ready with Call Progress Signal	Accept	Accept*	Accept*	Accept	Accept*	
Outgoing Call In Process			Accept		Ignore	
Outgoing Call In Process with Call Progress Signal			Accept		Ignore	
Incoming Call In Process			Accept		Ignore	
Data Ready			Accept		Ignore	Same as the base machine
Disconnect In Process			Ignore		Ignore	
Local				Ignore	Accept	

** Reset Call Progress Signals*

Note: In each box under "Operation," the upper row shows an indicator from column 8 and the lower row shows an indicator from column 20.

Figure C-2. Key Operation (During X.21 Switched States)

Key Pressed	Reaction	
	Dial-Originating Terminal	Other Terminal
DIAL	Clear Screen —z_ # ?	✖ 人 —z_ —z_ # #
DIRECT	 →z_	✖ 人 —z_ —z_ # #
LOCAL	 ↖z_ 599	✖ 人 —z_ —z_ # #
COMM	Ignore —z_ # ?	Ignore —z_ # #
DISC	 —z_	 —z_
AID	✖ – f —z_ # ?	✖ – f —z_ # #
CLEAR	Clear Screen * —z_ # ?	Clear Screen —z_ # #
TEST	Test Abort Dial	Test —z_ # #
ENTER	 →z_	✖ – f —z_ # #

* *Clear only the dial-in area*

Note: In each box under "Reaction," the upper row shows an indicator from column 8 and the lower row shows an indicator from column 20.

Figure C-3. Key Operation in Dial-In Mode

Call Progress Signal Code

The 'call progress' (CP) signal is sent by the network to advise a calling terminal/host about the progress of a call or about the circumstances that have prevented a connection from being established. It is transmitted by the network after receiving end-of-dialing and is not repeated. The 'call progress' codes and meanings are shown in Table C-1.

Note: The meaning of the codes is different in each country. Ask a specialist for details about code meanings.

Table C-1. Call Progress Signal Code

CPS Code	CPS Meaning
00	Wait
01	Terminal called
02	Redirected call
03	Connect when free
20	Number busy
21	Busy
22	Procedure error
23	Selection signal transmission error
41	Access barred
42	Changed number
43	Not obtainable
44	Out of order
45	Controlled not ready
46	Uncontrolled not ready
47	DCE power off
48	Invalid facility request
49	Network fault in local loop
51	Call information service
52	Incompatible user class of service
61	Network congestion
71	Long-term network congestion
72	RPOA out of order
81	Registration/cancellation confirmed.

X.21 Error Completion Modifier Bits

Table C-2 shows the meanings of the error completion modifier bits for an X.21 communication failure.

Table C-2. X.21 Error Completion Modifier Bits

Byte	Bit	Description
B1	0	Reserved.
	1	Reserved.
	2	The T1 (3-second) timer expired, indicating that the microcode did not receive the "proceed to select" state in response to signaling a call request.
	3	The T2 (20-second) timer has expired, indicating that on an outgoing call, neither a call progress signal or ready for data is detected after the selection signals are sent.
	4	The T5 or T6 (2-second) timer has expired, indicating that the DTE did not detect the DCE ready state in response to a DTE clear request or DTE clear confirmation.
	5	The T3A (2-second) timer has expired, indicating that ready for data is not detected after call progress signals are received and the calling DTE has not been told to wait 60 seconds. The T3B (60-second) timer has expired after a call progress signal was received, telling the calling DTE to wait 60 seconds for the "ready for data state" to be signaled (manual answer).
	6	The T4 timer (2-seconds) has occurred during an incoming call when "ready for data" is not detected after the microcode has signaled call accepted.
	7	Reserved.

List of Abbreviations

A

A. (1) Ampere. (2) Attention.

AC. Alternating current.

ACK. Acknowledge.

ACTLU. Activate Logical Unit.

ACTPU. Activate Physical Unit.

AEA. Asynchronous Emulation Adapter.

AID. Attention identifier.

Alt. Alternate.

APL. A Programming Language.

ASCII. American National Standard Code for Information Interchange.

ATTN. Attention.

B

B. Busy.

BIU. Basic information unit.

bps. Bits per second.

BSC. Binary synchronous communication.

C

C. Celsius.

C&D. Cause and diagnostic (codes).

CAW. Channel address word.

CC. Control check, Chain Command (flag).

CCITT. International Telegraph and Telephone Consultative Committee.

CD. Change direction.

CE. (1) IBM Customer Engineer. (2) Correctable error. (3) Channel-end.

CECP. Country extended code page.

CEM. Customer Engineering Memorandum.

char. Character.

CHIO. Channel input output.

CID. Connection identifier.

coax. Coaxial (cable).

comm. Communication.

cont. Continuous.

cps. Characters per second.

CR. (1) Command Reject. (2) Carriage return.

CRT. Cathode-ray tube.

CSCM. Central Site Change Management.

CSCU. Central Site Change Utility.

CSU. Customer setup.

CTL. Control.

ctr. Counter.

CTS. Clear to Send.

CU. Control unit.

CUG. Closed user group.

CUT. Control unit terminal.

D

D. Display.

DAA. Data-access arrangement.

DAF'. Destination address field prime (local address of SLU).

dBa. Adjusted decibels.

DC. Direct current.

DCC. Disconnect command chaining.

DCE. Data-circuit-terminating equipment.

DE. Device-end.

dec. Decimal.

DES. Data Encryption Standard.

dev. Device.

DFT. (1) Distributed function terminal. (2) Diagnostic function test.

DISC. Disconnect.

DM. (1) Disconnect mode. (2) Distribution Manager

DOS. Disk Operating System.

DPC. Dual-purpose connector.

DPKT. Default packet size.

DPPX. Distributed Processing Programming Executive.

Dsk. Diskette.

DSL. (1) Downstream load. (2) Data set label.

DSR. Data set ready.

DTE. Data terminal equipment.

DTR. Data terminal ready.

DWND. Default window size.

E

EB. End bracket.

EBCDIC. Extended binary-coded decimal interchange code.

EC. Engineering change.

ECC. Error-checking and correction.

ECMA. European Computer Manufacturers' Association.

EIA. Electronic Industries Association.

EPO. Emergency Power Off.

ERP. Error recovery procedures.

ESD. Electrostatic discharge.

ESC. Escape.

F

F. Fahrenheit.

FCC. Federal Communications Commission.

FCS. Frame checking sequence.

FF. Forms feed.

FM. Frequency modulation.

FMD. (1) Function management data. (2) Field macro diagram.

FP. Faceplate.

FRMR. Frame reject response.

FRU. Field-replaceable unit.

G

GFI. General format identifier.

H

hex. Hexadecimal.

HNAD. Host network (DTE) address.

HPCA. High-performance communication adapter.

I

I. Information (format).

ID. Identification, identifier.

IEEE. Institute of Electrical and Electronic Engineers.

IML. Initial microcode load.

in. Inch (or inches).

ind. Indicator.

I/O. Input/output.

IOPT. Incoming call option.

IR. Intervention Required.

K

k. 1000.

K. 1024.

KB. Kilobyte; 1024 bytes.

L

LAPB. Link access procedure balanced.

LC. Logical channel.

LCID. Logical channel identifier.

LED. Light-emitting diode.

LFU. Limited Function Utility

LLC. Logical link control.

LT. Logical terminal.

LU. Logical unit.

M

m. Meter (or meters).

MAC. (1) Medium access control. (2) Message authentication code.

MAP. Maintenance analysis procedure.

max. Maximum.

MB. Megabyte; 1 048 576 bytes.

Mbps. Megabits per second.

MDT. Modified data tag.

MLT. Multiple logical terminals.

mm. Millimeter (or millimeters).

MMIO. Memory-mapped input output.

modem. Modulator-demodulator.

MSR. Magnetic stripe reader.

MVS. Multiple virtual storage.

N

NCP. Network Control Program.

NIA. Network Interface Adapter.

NMVT. Network Management Vector Transport.

No. Number.

NOP. No operation.

NPKT. Negotiated packet size.

NRZ. Nonreturn to zero.

NTT. Nippon Telephone and Telegraph.

NUM. Numeric.

NWND. Negotiated window size.

O

OOPT. Outgoing call option.

P

PA. (1) Program access. (2) Program attention.

PAM. Printer authorization matrix.

PBX. Private branch exchange.

PC. Personal Computer.

pF. Picofarad.

PF. Program function.

PIO. Programmable input output.

PIU. Path information unit.

POST. Power-On Self Test.

PS. Programmed symbols.

PSDN. Packet switched data network.

PSH. Physical services header.

PT. Program Tab.

PU. Physical unit

PUID. Physical unit identification.

PVC. Permanent virtual circuit.

Q

QFRMR. Qualified frame reject response.

QLLC. Qualified logical link control.

QSM. Qualified set mode.

R

RAM. Random access memory.

rel. Relative.

Req. Request.

RNR. Request not ready, receive not ready.

ROS. Read-only storage.

RPOA. Recognized private operating agency.

RPQ. Request for price quotation.

RR. Request ready, receive ready.

RTM. Response Time Monitor.

RTS. Request to send.

RU. Request/response unit.

S

S. Sequenced (format), side.

SABME. Set Asynchronous Balance Mode Extended (command).

SAP. Service access point.

SBA. Set Buffer Address.

SC. Status code.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

SNA. Systems Network Architecture.

SNRM. Set Normal Response Mode.

SOEMI. Serial Original Equipment Manufacturer Interface.

SSCP. System services control point.

SVC. Switched virtual circuit.

SYSGEN. System generation.

T

TA. Terminal adapter.

TCLS. Throughput class negotiation.

TMA. Terminal multiplexer adapter.

TP. Teleprocessing.

TSR. Transistor switching regulator.

U

U. Unprotected.

UA. Unnumbered acknowledgment.

UCW. Unit control word.

U.S. United States.

V

V. Volt.

Vac. Volts alternating current.

VTAM. Virtual Telecommunications Access Method.

W

WCC. Write control character.

WSF. Write Structured Field.

WT. World Trade.

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 procedure. In a local area network (LAN), the procedure or protocol that is used to gain access to the transmission medium.

Note: The medium access procedures specified by the IEEE 802 standard are CSMA/CD token, bus, and ring.

access unit. In an IBM Token-Ring Network, a wiring concentrator. See *multistation access unit*.

acknowledgment. The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender.

active. Able to communicate on the network. An adapter is active if it is able to pass tokens on the network.

active logical terminal (LT). In MLT, the currently displayed logical terminal. Synonymous with *foreground logical terminal*. Contrast with *background logical terminal*.

active monitor. A function in a single adapter on a ring network that initiates the transmission of tokens and provides token error recovery facilities. Any active adapter on the ring has the ability to provide the active monitor function if the current active monitor fails.

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).

alert. (1) In the IBM Token-Ring Network Manager, a notification appearing on the bottom line of any panel to indicate an interruption or a potential interruption in the flow of data around the ring. (2) In NetView, a notification about a high-priority event that warrants immediate attention. This data-base record is generated for certain event types that are defined by user-constructed filters.

alternate 1 initial microcode load (Alt 1 IML). The action of loading the Utility microcode.

American National Standard Code for Information Interchange (ASCII). A standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

application. The use to which an information processing system is put, for example, a payroll application, an airline reservation application, or a network application.

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

ASCII emulation. The ability of a 3270 display station or printer to communicate with an ASCII host using the DEC VT100 or IBM 3101 data stream.

asynchronous. (1) Without regular time relationship; unexpected or unpredictable with respect to the execution of program instructions. (2) In asynchronous data transmissions, data characters may be sent or received at any time; no modem clocking is used to establish bit timing.

Asynchronous Emulation Adapter (AEA). In the 3174 Establishment Controller, an adapter that enables an ASCII terminal to communicate with a 3270 host using the 3270 data stream, an ASCII terminal to communicate with an ASCII host through the 3174, and a 3270 terminal to communicate with an ASCII host using the DEC VT100 data stream or the IBM 3101 data stream.

attach. To connect a device logically to a 3174 adapter, so that it can communicate over the network.

attaching device. Any device that is physically connected to a network and can communicate over the network.

attachment feature. The circuitry by which a cable from a local terminal or a modem for a remote terminal is attached to a 3792 Auxiliary Control Unit or a 3791 Controller.

attention (ATTN). An occurrence external to an operation that could cause an interruption of the operation.

attention identifier (AID). (1) A code in the inbound 3270 data stream that identifies the source or type of data that follows. (2) A character in a data stream indicating that the user has pressed a key, such as Enter, that requests an action by the system.

attribute. (1) A characteristic. (2) A terminal display language or transformation definition language (TDL) keyword that specifies a particular quality for the TDL object with which it is associated.

attribute select keyboard. A keyboard that enables the operator, when permitted by the program, to change the character attributes of the keyed-in character.

audible alarm. (1) An alarm that is sounded when designated events occur that require operator attention or intervention before system operation can continue. (2) A special feature that sounds a short, audible tone automatically when a character is entered from the keyboard into the next-to-last character position on the screen. The tone can also be sounded under program control.

auto-answer. See *automatic answering*.

auto-call. See *automatic calling*.

automatic answering. (1) Answering in which the called data terminal equipment (DTE) automatically responds to the calling signal.

Note: The call may be established whether or not the called DTE is attended.

(2) A machine feature that permits a station to respond without operator action to a call it receives over a switched line. See also *manual answering*. Contrast with *automatic calling*.

automatic calling. (1) Calling in which the elements of the selection signal are entered into the data network contiguously at the full data signaling rate. (2) A machine feature that permits a station to initiate a connection with another station over a switched line without operator action. (3) Synonymous with auto-call. See also *manual calling*. Contrast with *automatic answering*.

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.

background logical terminal (LT). In MLT, any logical terminal that is not currently displayed. Contrast with *active logical terminal (LT)*.

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.

base color. The capability of displaying or printing all characters in a field, in one of four colors, on a color terminal by use of combinations of the field protection and the field intensify bits of the field attribute.

beacon. Synonym for *beacon message*.

beacon frame. Synonym for *beacon message*.

beacon message. A frame or message repeatedly transmitted by a station on detection of a line break or outage. Transmission of beacon messages stops when the fault is bypassed or eliminated. Synonymous with *beacon* and *beacon frame*.

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

blink. An extended highlighting attribute value (for emphasis) of a field or character.

bracket. In SNA, one or more chains of request units (RUs) and their responses, which are exchanged between two LU-LU half-sessions and represent a transaction between them. A bracket must be completed before another bracket can be started. Examples of brackets are data base inquiries/replies, update transactions, and remote job entry output sequences to work stations.

bridge. (1) A functional unit that connects two local area networks (LANs) that use the same logical link control (LLC) procedure but may use different medium access control (MAC) procedures. (2) See also *backbone* and *gateway*.

Note: A bridge connects networks or systems of the same or similar architectures, whereas a gateway connects networks or systems of different architectures.

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of

occurrence of events, when transferring data from one device to another. (2) An isolating circuit used to prevent a driven circuit from influencing the driving circuit. (3) To allocate and schedule the use of buffers. (4) A portion of storage used to hold input or output temporarily.

buffer address. The address of a location in the buffer.

burst. (1) In data communication, a sequence of signals counted as one unit in accordance with some specific criterion or measure. (2) To separate continuous-form paper into discrete sheets.

bus. A type of network topology where the network consists of a bidirectional communication path with defined end points.

bypass. To eliminate an attaching device or an access unit from a ring network by allowing the data to flow in a path around it.

C

card. In the 3174 Establishment Controller, a unit of electronic circuitry contained in a plastic casing (or cassette) and providing the controller with a specialized function, for example, a Terminal Adapter or an Encrypt/Decrypt Adapter.

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

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

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

channel-attached. Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. Synonym for *local*. Contrast with *telecommunication-attached*.

channel-to-channel adapter. A hardware device that can be used to connect two channels on the same computing system or on different systems.

character set. (1) A defined collection of characters. (2) A group of characters used for a specific reason, for example, the set of characters a printer can print. (3) The collection of graphic characters required to support a specific language.

Clear to Send (CTS) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the CTS lead on an EIA 232D interface.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

cluster controller. A device that can control the input/output operations of more than one device connected to it. A cluster controller may be controlled by a program stored and executed in the unit, for example, the IBM 3601 Finance Communication Controller. Or, it may be entirely controlled by hardware, for example, the IBM 3272 Control Unit. See also *cluster* and *cluster controller node*. Synonymous with *cluster control unit*.

cluster controller node. A peripheral node that can control a variety of devices. See also *host node*, *Network Control Program (NCP) node*, and *terminal node*.

cluster control unit. Synonym for cluster controller.

coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

code violation. In differential Manchester code encoding, a bit that does not have a state transition at the mid-bit point. See *differential Manchester code*.

command. An instruction that directs a control unit or device to perform an operation or a set of operations.

command retry. A channel and control unit procedure that causes a command to be retried without requiring an I/O interruption.

communication adapter. (1) A circuit card with associated software that enables a processor, controller, or other device to be connected to a network. (2) See *EIA communication adapter*, *V.35 communication adapter*, and *X.21 communication adapter*.

communication controller. (1) A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program processed in a processor to which the controller is connected or by a program executed within the device. (2) A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network. (3) See also *cluster controller*, *communication controller node*, and *transmission control unit*.

communication controller node. A subarea node that does not contain a system services control point (SSCP).

communication control unit. A communication device that controls transmission of data over lines in a network.

completion code. The final return code provided by the adapter as a result of an issued command.

component. (1) Hardware or software that is part of a functional unit. (2) A functional part of an operating system, for example, the scheduler or supervisor. (3) In systems with VSAM, a named, cataloged collection of stored records, such as the data component or index component of a key-sequenced file or alternate index. (4) In System/38 graphics, the representation of a data group on a chart. (5) See *terminal component* and *solid state component.*

configuration. The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term *configuration* may refer to a hardware configuration or a software configuration. See also *system configuration.*

Connection Menu. A menu on the screen of a display station attached to the 3174 Establishment Controller, from which a user can select an available host.

connector. A means of establishing electrical flow.

control block. In the IBM Token-Ring Network, a specifically formatted block of information provided from the application program to the Adapter Support Interface to request an operation.

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

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

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

control function. Synonym for *control operation.*

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

control operation. An action that affects the recording, processing, transmission, or interpretation of data; for example, starting or stopping a process, carriage return, font change, rewind, and end of transmission. Synonymous with *control function.*

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

control unit terminal (CUT). A terminal that relies on the 3174 to interpret the data stream. Examples are the 3178, 3179, 3278 Model 2, and 3279 Model S2A.

control unit terminal (CUT) mode. A host-interactive mode that enables an IBM 3270 Personal Computer customized in this mode to run only one session emulating a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

conversion. (1) In programming languages, the transformation between values that represent the same data item but belong to different data types. Information may be lost as a result of conversion because accuracy of data representation varies among different data types. (2) The process of changing from one method of data processing to another or from one data processing system to another. (3) The process of changing from one form of representation to another, for example, to change from decimal representation to binary representation.

country extended code page (CECP). A function of the 3174 microcode that provides for a code page containing additional code points beyond those available with Table 5A code pages. CECP is supported by a universal character set, Character Set 697, which contains 190 characters.

create. In 3174 central site customizing, to create a library member for a network controller, and store the customizing data for that library member on a Library diskette.

cursor. (1) A movable, visible mark used to indicate the position at which the next operation will occur on a display surface. (2) A unique symbol that identifies a character position in a screen display, usually the character position at which the next character to be entered from the keyboard will be displayed.

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

customizing keyboard. A keyboard used to type in the customizing responses; this keyboard must be a Typewriter, Data Entry, APL (with APL off), or Text (with Text off) keyboard with a QWERTY layout. (On a QWERTY layout, the first six characters on the left side of the top row of alphabetic characters are Q, W, E, R, T, Y.)

D

data circuit-terminating equipment (DCE). In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line.

Notes:

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.
2. A DCE may perform other functions that are usually performed at the network end of the line.

Data Entry keyboard. A keyboard layout designed for data entry applications.

data link. Any physical link, such as a wire or a telephone circuit, that connects one or more devices or communication controllers.

data stream. (1) All data transmitted through a data channel in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format. See also *data stream format.*

data stream format. In SNA, the format of the data elements (end-user data) in the request unit (RU). See also *3270 data stream* and *SNA character string (SCS).*

data terminal equipment (DTE). That part of a data station that serves as a data source, data sink, or both.

Data Terminal Ready (DTR) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the DTR lead on an EIA 232D interface.

data transfer. The movement, or copying, of data from one location and the storage of the data at another location.

data transfer mode. Synonym for *data transfer phase.*

data transfer phase. (1) The phase of a data call during which data signals can be transferred between data terminal equipment (DTEs) connected by the network. (2) Synonymous with *data transfer mode.*

decode. (1) To convert data by reversing the effect of some previous encoding. (2) To interpret a code. Contrast with *encode.*

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

default destination. A destination for display stations and printers that is defined in customization.

delimiter. A bit pattern that defines the limits of a frame or token on a ring network.

destination. Any point or location, such as a node, station, or a particular terminal, to which information is to be sent.

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

differential Manchester code. A data-encoding method used by the IBM Token-Ring Network. In this method, a bit has the value of binary 0 if there is a state transition (polarity change) at the beginning of the bit boundary. The bit has the value of binary 1 if there is no transition. In a properly encoded bit, there must always be a transition at every *midpoint* position. If the transition is absent, a code violation results. Since only the presence or absence of the state transition (and not the actual polarity) determines a bit's value, this method of coding is polarity-independent.

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

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

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

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

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

display frame. (1) In computer graphics, an area in storage in which a display image can be recorded. (2) In computer micrographics, an area on a microform in which a display image can be recorded.

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

distributed function terminal (DFT). A programmable terminal that can perform operations previously performed by the control unit. These terminals can interpret the 3270 data stream themselves. Examples are the IBM 3270 Personal Computer and the 3290 Information Panel.

distributed function terminal (DFT) mode. A host-interactive mode that enables an IBM 3270 Information Display System customized in this mode to run as many as four host sessions. The sessions can emulate a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

downstream. (1) In the direction of data flow or toward the destination of transmission. (2) From the processor toward an attached unit or end user. (3) Contrast with *upstream*.

downstream load (DSL). The capability of a distributed function terminal to receive its control program from the control unit to which it is attached. A diskette containing the terminal's control program is loaded into the control unit.

drop. In the IBM Cabling System, a cable that runs from a faceplate to the distribution panel in a wiring closet.

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full duplex*.

E

EIA communication adapter. A communication adapter conforming to EIA standards that can combine and send information on two lines at speeds up to 19.2 kbps.

EIA 232D. An electrical interface defined by the Electronics Industries Association for establishing connections and controlling data flow between data terminal equipment and data communication equipment. The interface has been adapted to allow communication between DTEs.

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*.

encode. (1) To convert data by the use of a code or a coded character set in such a manner that reconversion to the original form is possible. *Encode* is sometimes loosely used when complete reconversion is not possible. Contrast with *decode*.

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.

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

extended field attribute. Additional field definition to the field attribute that controls defining additional properties; for example, color, highlighting, character set, and field validation. The extended field attribute is altered by information passed in the Start Field Extended and Modify Field orders.

F

field. See *display field*.

field attribute. A control character stored in the character buffer in the first character position of a field. For those devices supporting the 3270 data stream, a field attribute defines protected/unprotected, alphanumeric/numeric, detectable/nondetectable, display/nondisplay, intensity, and modified data tag (MDT).

file. A named set of records stored or processed as a unit.

file adapter. In the 3174, an adapter that provides input/output support for external storage devices, such as a diskette drive.

fixed disk. A rigid magnetic disk used in a fixed disk drive.

fixed disk drive. A disk storage device that reads and writes on rigid magnetic disks.

flag. (1) An indicator or parameter that shows the setting of a switch. (2) Any of various types of indicators used for identification, for example, a wordmark. (3) A character that signals the occurrence of some condition, such as the end of a word. (4) Deprecated term for *mark*.

flow control. (1) In data communication, control of the data transfer rate. (2) In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units with minimum congestion in the network, that is, neither to overflow the buffers at the receiver or at intermediate routing nodes nor to leave the receiver waiting for more message units. (3) The methods used to control the flow of information across a network.

foreground logical terminal (LT). Synonym for *active logical terminal (LT)*.

frame. (1) The portion of a tape, on a line perpendicular to the reference edge, on which binary characters can be written or read simultaneously. (2) A housing for machine elements. (3) The hardware support structure, covers, and all electrical parts mounted therein that are packaged as one entity for shipping. (4) A formatted display. See *display frame*.

from diskette. The diskette that provides the data to be transferred.

from drive. The drive that provides the data to be transferred.

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.

get. In 3174 central site customizing, to select the type of data you want and store it in working copy.

H

half-duplex. In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

hard error. An error condition on a network that requires that the network be reconfigured or that the source of the error be removed before the ring can resume reliable operation. Contrast with *soft error*.

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

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

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

host system. (1) A data processing system used to prepare programs and operating environments for use on another computer or controller. (2) The data processing system to which a network is connected and with which the system can communicate. (3) The controlling or highest-level system in a data communication configuration; for example, a System/38 is the host system for the work stations connected to it.

I

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

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

initial microcode load (IML). The action of loading the operational microcode.

input/output (I/O). (1) Pertaining to a device whose parts can perform an input process and an output process at the same time. (2) Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process. (3) Pertaining to input, output, or both.

interface. (1) A shared boundary between two functional units, defined by functional characteristics,

common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (2) A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. (3) Hardware, software, or both, that links systems, programs, or devices.

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

leased line. Synonym for *nonswitched line*.

light pen. A light-sensitive pick device that is used by pointing it at the display surface.

Limited Function Utility (LFU) diskette. A diskette that contains the microcode to run only a limited number of utilities. These are: Diagnostics, Copy Files, Encrypt/Decrypt Master Key, and Identify Customizing Keyboard. The Limited Function Utility diskette is used mainly in networks that are under central site control.

line speed. (1) The rate at which data is transmitted from one point to another over a telecommunication line. (2) The number of binary digits that can be sent over a telecommunication line in 1 second, expressed in bits per second (bps).

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

link station. (1) A specific place in a service access point that enables an adapter to communicate with another adapter. (2) A protocol machine in a node that manages the elements of procedure required for the exchange of data traffic with another communicating link station.

lobe. In the IBM Token-Ring Network, the section of cable that attaches a device to an access unit. The cable may consist of several segments.

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.

logical terminal (LT). In MLT, one of five sessions available to share one display station.

logical unit (LU). In SNA, a port through which an end user accesses the SNA network in order to communicate with another end user and through which the end user accesses the functions provided by system services control points (SSCPs). An LU can support at least two sessions, one with an SSCP and one with another LU, and may be capable of supporting many sessions with other logical units.

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.

maintenance analysis procedure (MAP). A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

manual answering. (1) Answering in which a call is established only if the called user signals a readiness to receive the call by means of a manual operation. (2) Operator actions to prepare a station to receive a call on a switched line. Contrast with *automatic answering*.

manual calling. (1) Calling that permits the entry of selection signals from a calling data station at an undefined character rate. (2) Operator actions to place a call over a switched line. Contrast with *automatic calling*.

mark. A symbol or symbols that indicate the beginning or the end of a field, a word, an item of data or a set of data such as a file, record, or block.

medium access control (MAC) procedure. In a local area network, the part of the protocol that governs access to the transmission medium independently of the physical characteristics of the medium, but taking into account the topological aspects of the network, in order to enable the exchange of data between data stations.

Medium Access Control (MAC) frame. Frames that control the operation of the IBM Token-Ring Network and any ring station operations that affect the ring.

memory. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent execution or processing. Synonymous with *main storage*.

microcode. (1) One or more microinstructions. (2) A code, representing the instructions of an instruction set, that is implemented in a part of storage that is not program-addressable. (3) To design, write, and also to test one or more microinstructions.

modem (modulator/demodulator). A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

modified data tag (MDT). A bit in the attribute character of a display field that, when set, causes that field to be transferred to the channel during a read-modified operation. The modified data tag may be set by a keyboard input to the field, a selector-pen detection in the field, a card read-in operation, or program control. The modified data tag may be reset by a selector-pen detection in the field, program control, or ERASE INPUT key.

multidrop (network). A network configuration in which there are one or more intermediate nodes on the path between a central node and an endpoint node.

multiple logical terminal (MLT). In the 3174, a function that provides a CUT-attached, fixed-function display station with the ability to interact with as many as five host sessions. Each session is processed as though it were a separate display station.

multistation access unit. In the IBM Token-Ring Network, a wiring concentrator that can connect up to eight lobes to a ring.

N

native mode. A 3179 or 3180 operational mode that uses the full capabilities of those models' display and keyboard.

NetView. A comprehensive network management product that is the basis for central control of both systems for network operations. It supersedes NCCF, NPDA, NLDM, and NPM.

network. (1) An arrangement of nodes and connecting branches. Connections are made between data stations. (2) A configuration of data processing devices and software connected for information interchange.

network administrator. A person who manages the use and maintenance of a network.

Network Control Program (NCP) node. In SNA products, a subarea node that contains an ACF/NCP program but not a system services control point (SSCP).

node. An end point of a link or a junction common to two or more links in a network.

nonswitched line. (1) A connection between systems or devices that does not have to be made by dialing. Contrast with *switched line*. (2) A telecommunication line on which connections do not have to be established by dialing. Synonymous with *leased line*.

null modem. A device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D cable. The null modem does the crossing-over of the appropriate EIA 232D leads required for the direct connection of a terminal or computer to an AEA port.

O

offline test. A diagnostic test or data collection program that must be run when the 3174 and its connected terminals are not in normal operation.

online test. A diagnostic test or data collection program that is run without interrupting the normal operation of the 3174 and its associated terminals.

open. (1) To make an adapter ready for use. (2) A break in an electrical circuit.

operator information area (OIA). The area below the line near the bottom of the display area where graphics and alphanumeric characters are displayed to define the status of the terminal or the system to the operator.

P

pacing. (1) A technique by which a receiving station controls the rate of transmission of a sending station to prevent overrun. (2) In SNA, a technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (4) Pertaining to the simultaneity of two or more processes. (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (6) Contrast with *serial*.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (2) An item in a menu for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

parity. (1) A transmission error-checking scheme in which an extra bit is added to some unit of data, usually a byte, in order to make the total number of one bits even or odd. For the AEA feature, odd, even, mark, space, or no-parity coding is supported. No-parity means that no parity bit is sent or expected. Mark and space mean that the parity position is always set to one or zero, respectively, and that received parity is not checked. (2) The state of being either even-numbered or odd-numbered.

parity check. (1) A redundancy check by which a recalculated parity bit is compared with the pregiven parity bit. (2) A check that tests whether the number of ones (or zeros) in an array of binary digits is odd or even.

path. In a network, a route between any two nodes.

physical unit (PU). In SNA, the component that manages and monitors the resources (such as attached links and adjacent link stations) of a node, as requested by an SSCP through an SSCP-SSCP session.

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.

Power-On Self-Test (POST). A series of diagnostic tests that are run each time the computer's power is turned on.

printer authorization matrix (PAM). A matrix stored in the controller 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*.

programmable symbols (PS). Customer-defined symbols. There are a maximum of 190 symbols in a programmed symbol set.

programmed symbols (PS). In the 3270 Information Display System, an optional feature that stores up to six user-definable, program-loadable character sets of 190 characters each in terminal read/write storage for display or printing by the terminal.

Program Tab (PT) order. An order that advances the current buffer address to the address of the first character location of the next unprotected field and resets the character attributes of all characters in the field that are replaced by nulls.

protected field. (1) In word processing, preset data or an area that cannot be changed or overridden by an operator without altering the program. (2) On a display device, a display field in which a user cannot enter, modify, or erase data. Contrast with *unprotected field*.

protocol. (1) A set of semantic and syntactic rules that 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.

protocol conversion. For the AEA feature, emulation of one device protocol by a device designed for a different protocol.

protocol handler. Programming in an adapter that encodes and decodes the protocol used to format signals sent along a network.

put. In 3174 central site customizing, to store data from the working copy into a library member.

R

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

receptacle. See *lobe receptacle*.

register. A storage device having a specified storage capacity such as a bit, byte, or computer word, and usually intended for a special purpose.

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line.

request for price quotation (RPQ). An alteration or addition to the functional capabilities that the controller provides.

Response Time Monitor (RTM). A network management tool that measures and records the transaction times of inbound host attention (AID) operations from display stations that communicate with the host.

return code. (1) A code used to influence the execution of succeeding instructions. (2) A value returned to a program to indicate the results of an operation requested by that program.

ring interface adapter. A device that assumes the basic data transmission functions of node, such as frame recognition, address decoding, error checking, buffering of frames, fault detection, and, in Token-Ring Networks, token generation.

ring network. A network configuration where a series of attaching devices are connected by unidirectional transmission links to form a closed path.

ring status. The condition of the ring.

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

segment. A section of cable between components or devices on the network. A segment may consist of a single patch cable, multiple patch cables connected, or a combination of building cable and patch cables connected.

selector pen. A pen-like instrument that can be attached to a display station. When a program using full-screen processing is assigned to the display station, the pen can be used to select items on the screen or to generate an attention. Synonym for *light pen*.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (4) Contrast with *parallel*.

service access point. A logical point made available by an adapter where information can be received and transmitted. A single SAP can have many links terminating in it.

session. (1) In network architecture, an association of facilities necessary for establishing, maintaining, and releasing connections for communication between stations. (2) In MLT, synonymous with logical terminal (LT). (3) In SNA, a logical connection between two network addressable units that can be activated, tailored to provide various protocols, and deactivated as requested.

Set Buffer Address (SBA) order. An order that sets the buffer address to a specified location.

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.

soft error. An intermittent error on a network that requires retransmission. Contrast with *hard error*.

Note: A soft error by itself does not affect overall reliability of the network, but reliability may be affected if the number of soft errors reaches the ring error limit.

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.

star. A wiring arrangement in which an individual cable runs from each work area to a concentration point.

station. (1) An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line. (2) A location in a device at which an operation is performed, for example, a read station. (3) In SNA, a link station.

stop bit. Synonym for *stop signal*.

stop signal. In start-stop transmission, a signal at the end of a character that prepares the receiving device for reception of a subsequent character. Synonymous with *stop bit*.

storage. A unit into which recorded text can be entered, in which it can be retained and processed, and from which it can be retrieved. See also *memory*.

structured field. A data stream format that permits variable-length data and controls to be parsed into its components without having to scan every byte.

subsystem. A secondary or subordinate system, or programming support, usually capable of operating independently of or asynchronously with a controlling system. The 3174 and its attached terminals are an example of a subsystem.

switched line. A telecommunication line in which the connection is established by dialing. Contrast with *nonswitched* line.

synchronous. (1) Pertaining to two or more processes that depend on the occurrences of a specific event, such as common timing signal. (2) Occurring with a regular or predictable time relationship.

Synchronous Data Link Control (SDLC). A discipline conforming to subsets of the Advance Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. See also *binary synchronous communication (BSC)*.

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

system services control point (SSCP). In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its domain.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

T

telecommunication-attached. Pertaining to the attachment of devices by teleprocessing lines to a host processor. Synonym for *remote*. Contrast with *channel-attached*.

telecommunication control unit. See *communication control unit*.

terminal. In data communication, a display station or printer capable of sending or receiving information.

terminal adapter (TA). An adapter that provides control for a maximum of 32 terminals; each BNC connector (four in all) on the terminal adapter can control either one terminal that is directly attached or as many as eight terminals that are attached through a terminal multiplexer adapter (located in the 3174) or a 3299 Terminal Multiplexer (located outside the 3174).

terminal component. A separately addressable part of a terminal that performs an input or output function, such as the display component of a keyboard-display device or a printer component of a keyboard-printer device.

terminal emulation. The capability of a microcomputer, personal computer, 3270 CUT mode display station, 3270 printer, ASCII display station, or ASCII printer to operate as if it were a particular type of terminal linked to a processing unit and to access data.

terminal multiplexer. A device, such as the 3299 Terminal Multiplexer, for interleaving the signals for many devices onto a single coaxial cable.

terminal multiplexer adapter (TMA). This adapter is connected to the terminal adapter in the 3174 and provides control for a maximum of eight terminals.

terminal node. (1) In a hierarchical data base, a node that has no subordinate records or segments. (2) In SNA products, a peripheral node that is not user-programmable and has less processing capability than a cluster controller node. Examples are nodes consisting of the IBM 3277 Data Station, 3767 Communication Terminal, 3614 Consumer Transaction Facility, and 3624 Consumer Transaction Facility.

terminal port. (1) In a network, the functional unit of a node through which data can enter or leave the network. (2) The part of a processor that is dedicated to a single data channel for the purpose of receiving data from or transferring data to one or more external or remote devices.

terminal type menu. A list of all the available names and terminal types for a given port.

time-out. (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted. (3) A terminal feature that logs off a user if an entry is not made within a specified period of time.

to diskette. The diskette that receives the transferred data.

to drive. The drive that receives the transferred data.

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.

type-1 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using any of these interfaces: (a) EIA 232D/V.24 and V.35 for SNA/SDLC, (b) BSC, and (c) X.25. The user selects the appropriate interface.

type-2 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using either the X.21 interface for SNA/SDLC or the X.25 interface. The user selects the interface.

U

unprotected field. A displayed field in which a user can enter, modify, or delete data. Contrast with *protected field*.

update. In 3174 central site customizing, to tailor a library member's customizing data, in working copy, and put it back to the library diskette.

upgrade. In 3174 central site customizing, to select a library member and upgrade its data to the microcode level of the Central Site Customizing Procedure diskette.

upstream. (1) In the direction opposite to data flow or toward the source of transmission. (2) Toward the processor from an attached unit or end user. (3) Contrast with *downstream*.

Utility disk. A diskette or fixed disk that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

Utility (UTL) diskette. A diskette that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

V

V.35 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and conforms to the CCITT V.35 standard.

W

wire fault. An error condition caused by a break in the wires or a short between the wires (or shield) in a segment of cable.

work area. An area in which terminals (such as display stations, keyboards, and printers) are located. Access units may also be located in work areas.

wrap test. A test that checks attachment or control unit circuitry without checking the mechanism itself by returning the output of the mechanism as input. For example, when unrecoverable communication adapter or machine errors occur, a wrap test can transmit a specific character pattern to or through the modem in a loop and then compare the character pattern received with the pattern transmitted.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

write control character (WCC). A character used in conjunction with a Write command to specify that a particular operation, or combination of operations, is to be performed at a display station or printer.

Write Structured Field (WSF) command. A command used to transmit data in structured field format.

X

X.21. In data communication, a recommendation of the International Telegraph and Telephone Consultative Committee (CCITT) that defines the interface between data terminal equipment and public data networks for digital leases and circuit switched synchronous services.

X.21 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and that conforms to CCITT X.21 standards.

X.25. In data communication, a recommendation of the CCITT that defines the interface between data terminal equipment and packet switching networks.

3

3270 data stream. (1) The commands, control codes, orders, attributes, and data or structured fields for 3270 devices, that are transmitted inbound to an application program or outbound to a terminal. (2) Data being transferred from or to an allocated primary or tertiary device, or to the host system, as a continuous stream of data and 3270 Information Display System control elements in character form.

3270 emulation. The use of a program that allows a device or system such as a personal computer or a System/38 to operate in conjunction with a host system as if it were a 3270-series display station or control unit.

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