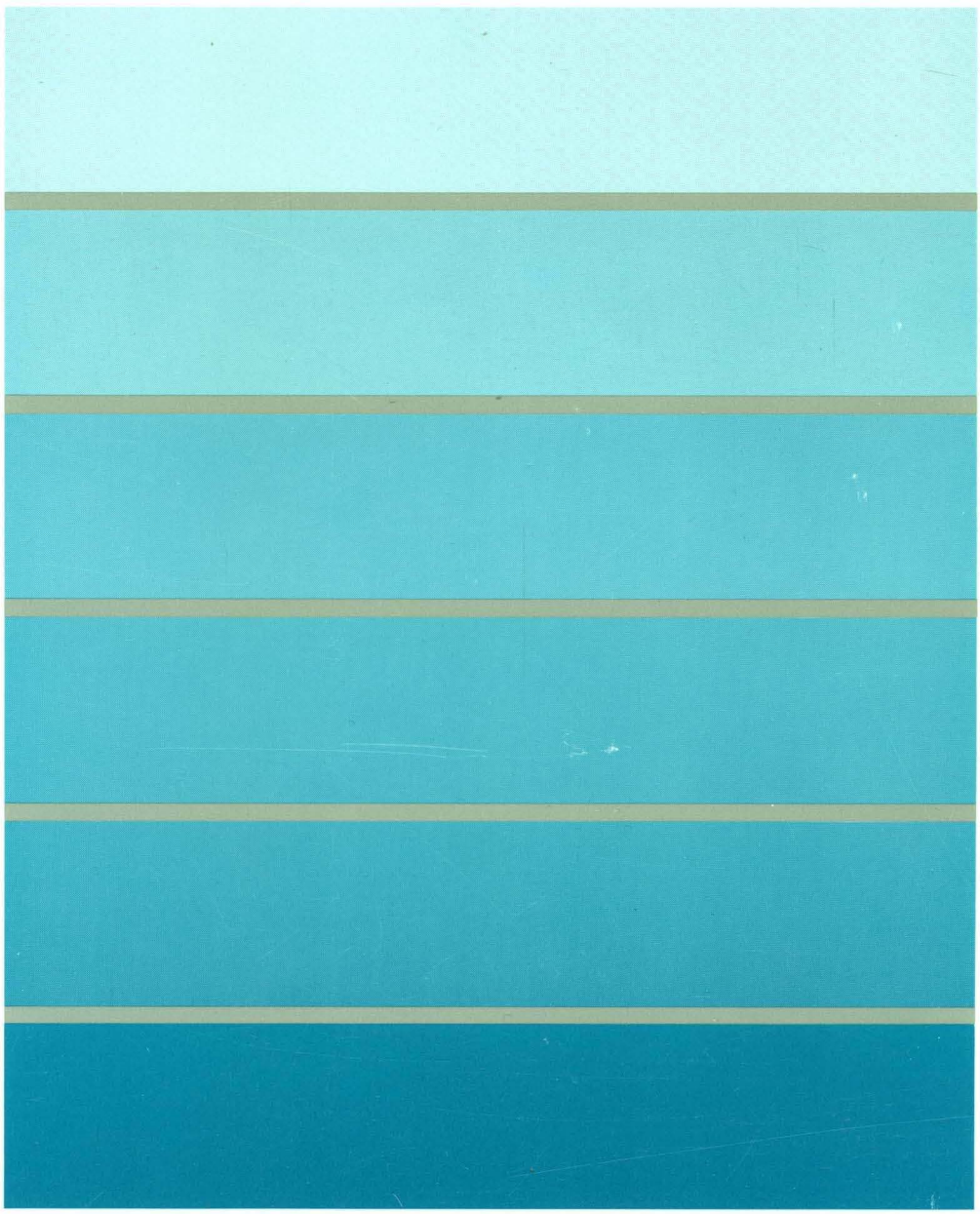
3174 Establishment Controller

SY27-2584-03

Models 81R, 82R, 91R, and 92R Maintenance Information



3270 Information Display System

3174 Establishment Controller

SY27-2584-03

Models 81R, 82R, 91R, and 92R Maintenance Information

Fourth Edition (May 1989)

This revision obsoletes and replaces SY27-2584-2. See "Summary of Changes" on page xxi 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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The following warning statements (required by country regulatory agencies) are applicable in the countries indicated.

United States

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

Additional IBM Statement

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

Instructions to User:

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

United Kingdom

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

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

Canadian Department of Communications compliance statement

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Choosing the Right Book from the 3174 Library

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

To Organize Library Materials:

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

To Become Familiar with the 3174:

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

To Prepare Your Site for the 3174:

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

To Set Up and Operate the 3174:

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

To Plan for and Customize the 3174:

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 81R, 82R, 91R, and 92R 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 representatives who maintain the 3174 Establishment Controller Models 81R, 82R, 91R, and 92R.

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 Models 81R, 82R, 91R, and 92R 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 specific cause, such as a defective logic card, a communication failure, a data stream problem, or an attached-device failure. 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 five 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 subsystem 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 Online Tests (370/OLTs)

Chapter 3, Repair Information, contains locations and removal/replacement procedures.

Chapter 4, Safety Inspection Guide, contains information to determine whether a machine can be placed on an IBM maintenance agreement.

Chapter 5, Parts Catalog, contains illustrations and part numbers for the 3174 Models 81R, 82R, 91R, and 92R.

This 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.

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Summary of Changes

Fourth Edition (May 1989)

This revision of the *IBM Subsystem Control Unit Models 81R, 82R, 91R, and 92R Maintenance Information* manual contains the following new information:

- The name of the 3174 was changed from Subsystem Control Unit to Establishment Controller.
- All references to control unit were changed to controller.
- The name of this manual was changed to include the new models.
- This edition includes Release A5, S5, and B microcode changes.
- 2.4MB diskette.

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

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Introduction

This chapter provides the following general information about the IBM 3174 Establishment Controller Models 81R, 82R, 91R, and 92R:

- Service strategy
- Configurations
- General description
  - Field Replaceable Unit (FRU) descriptions and functions
  - Hardware group numbers
  - Type numbers
  - Status code description
  - 3174 event log description
  - Diskettes
  - Operator panel
- IML
  - Normal IML
  - Alt 1 IML
  - Alt 2 IML
- Environmental restrictions
- Special tools and testing.

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.

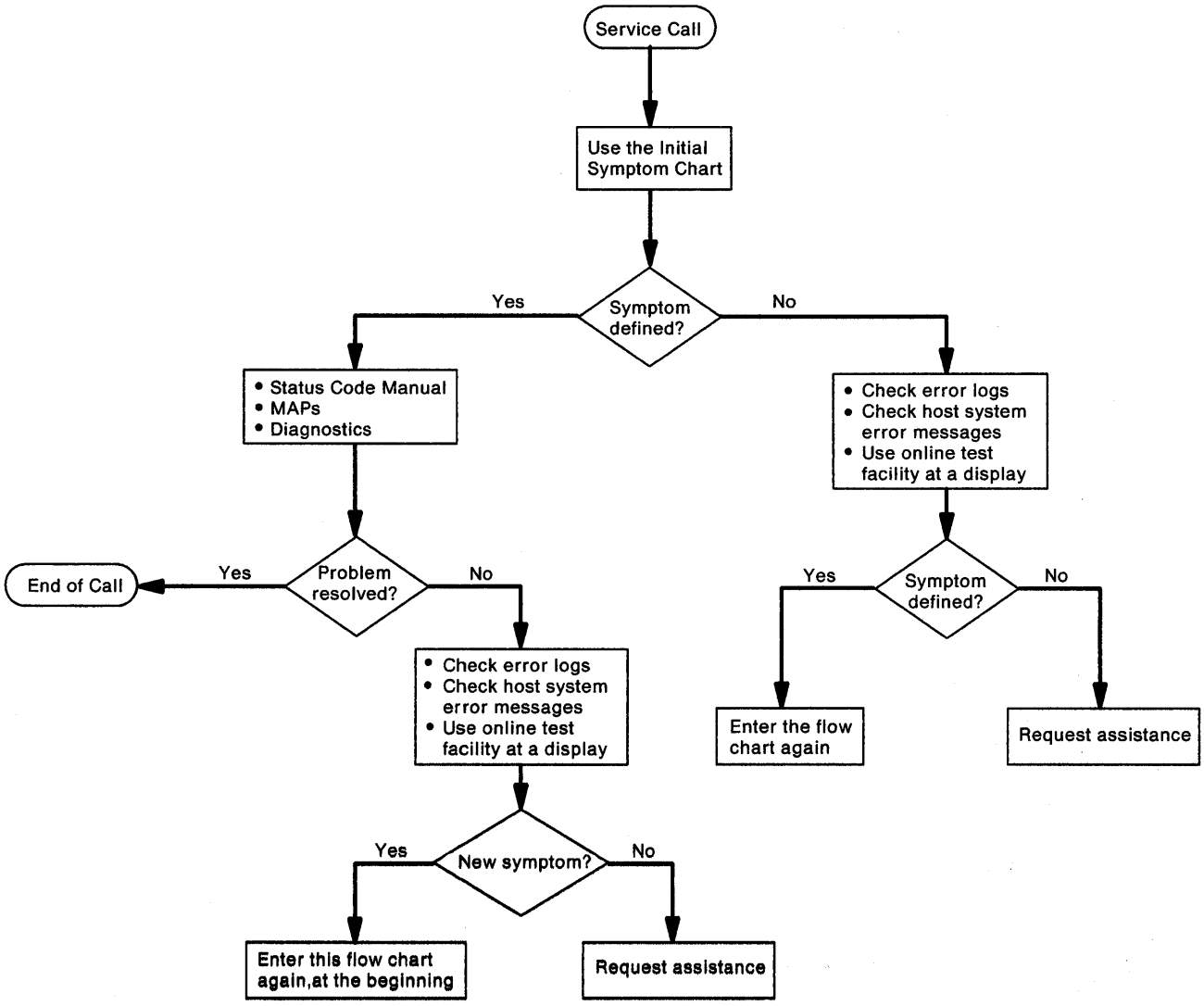


Figure 1-1. 3174 Service Strategy

3174 General Description

This section contains information about 3174 Models 81R, 82R, 91R, and 92R base hardware, host communication configurations, and terminal attachment configurations.

3174 Hardware Configurations

The 3174 Establishment Controllers are available in a base hardware configuration. The controllers are compatible with System Network Architecture (SNA) and with non-SNA and allow attachment of a maximum of eight terminals, such as 3278s, for communication with a host processor. The 3174 model designation depends on the type of communication adapter installed in the controller:

- Models 81R and 91R are telecommunication-attached using EIA/V.35 interface.
- Models 82R and 92R are telecommunication-attached using X.21 interface.

Models 81R, 82R, 91R, and 92R Base Hardware

Table 1-1. 3174 Models 81R, 82R, 91R, and 92R Base Hardware

Communication Adapter (BSC or SDLC)
Type 1 (V.35/EIA) (Models 81R and 91R)
or
Type 2 (X.21) (Models 82R and 92R)
Terminal Adapter (TA)
Four directly attached terminals
or up to
Eight terminals via one 3299
Storage Size
1MB (MB equals 1 048 576 bytes) Models 81R and 82R
2MB Models 91R and 92R
Diskette Drive
5.25-inch diskette
1.2MB capacity on Models 81R and 82R
2.4MB capacity on Models 91R and 92R

Models 81R, 82R, 91R, and 92R Host Communication Configurations

Models 81R, 82R, 91R, and 92R communicate with the following host processors 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.

- System 38 (SDLC only)
- System 88
- 308x
- 3090
- 4361 and 4381
- 8100 (SDLC only)
- 9370
- AS400

Host connections are made through the provided interface cable to the I/O connector labeled **HG11** (see Figure 1-3 on page 1-6).

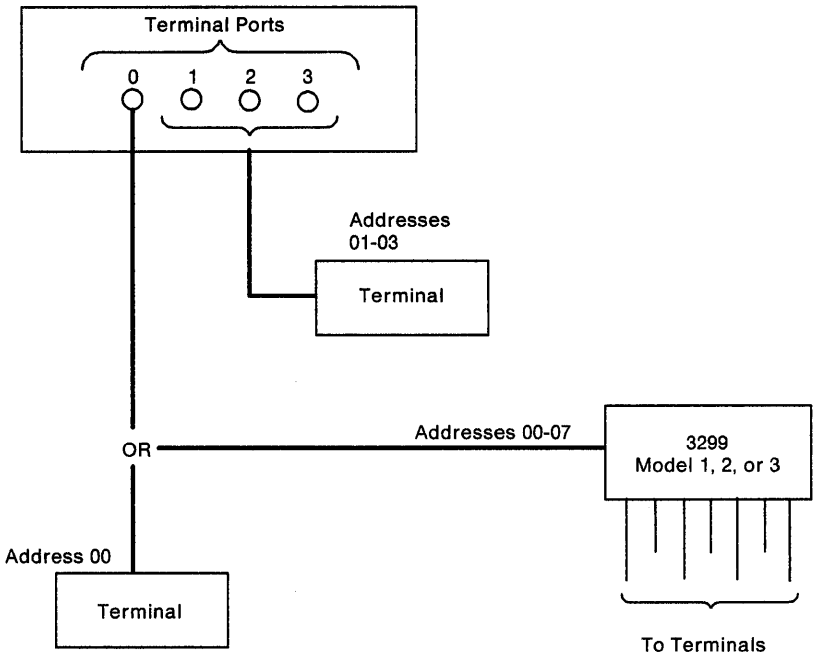
Note: The interface cable that is provided is the only cable that can be used. If this controller is replacing an existing controller, the interface cable that was used on the existing controller cannot be attached to the 3174.

3174 Terminal Attachment Configurations

Terminals attach to the 3174 Establishment Controller by two different methods:

- Directly connected to a port on the planar board.
- Connected to a 3299 Terminal Multiplexer.

The two different methods are illustrated in Figure 1-2 on page 1-5.



Note: Ports 1 through 3 are disabled when a 3299 multiplexer is attached to port 0.

Figure 1-2. Block Diagram of Terminal Attachment

Table 1-2 shows two terminal attachment configurations with the maximum number of terminals attached for each configuration. For a typical terminal attachment configuration, see Figure 1-3.

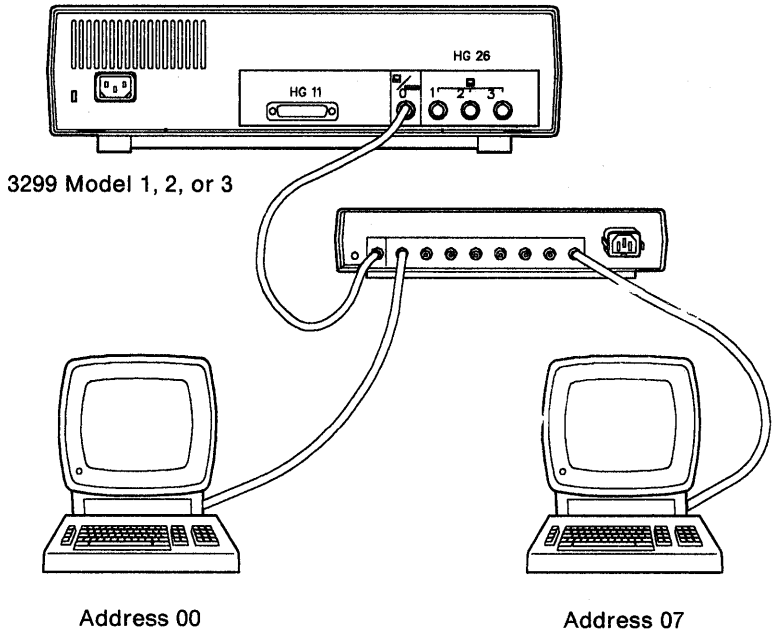
Table 1-2. Attachment Configurations

Terminals Directly Attached	**Terminals 3299 Attached**	**3299s Installed**	**Total Terminals Attached**
4	0	0	4
0	8	1	8

Figure 1-3 on page 1-6 shows an example of the two ways terminals attach to the 3174. The two configurations allow a maximum of four directly attached terminals or eight terminals attached through a 3299 Terminal Multiplexer.

Notes:

1. The 3299 multiplexer can only be attached to port 0.
2. Ports 1 through 3 are disabled when a 3299 is attached to port 0.



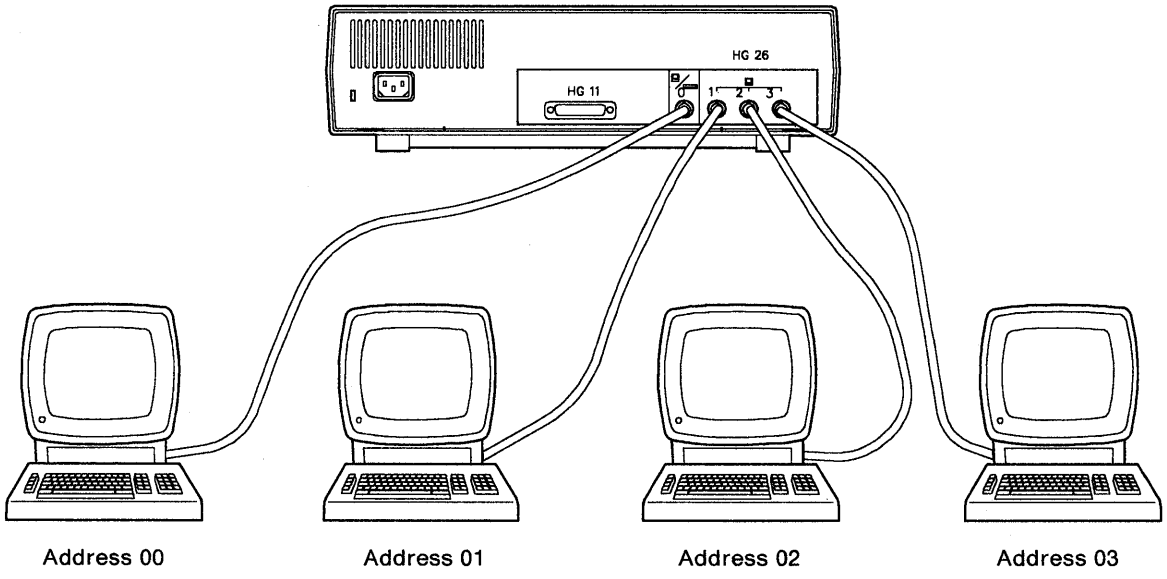


Figure 1-3. Examples of Terminal Attachment

3174 Field Replaceable Unit (FRU) Descriptions and Functions

The following paragraphs describe the functions of the planar board, the diskette drive, and the operator panel.

Planar Board

The planar board contains the processor logic, storage logic, and the following adapter logic:

- File adapter
- Terminal adapter
- Communications adapter (EIA/V.35 or X.21)
- Operator panel adapter.

Diskette Drive HG 01

The diskette drive uses a high-capacity, double-sided, soft-sectored, 5.25-inch removable diskette. The diskette drive motor is +12 Vdc, direct drive (nonbelt). The 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 removed from the controller. The drive interfaces with the file adapter through a common bus. The drive also interfaces with the FRU ID bus. Models 81R and 82R have a 1.2MB diskette drive; Models 91R and 92R have a 2.4MB diskette drive.

File Adapter HG 01

The file adapter provides read/write control for the diskette drive. The file adapter interfaces with the PIO bus and the diskette drive.

Operator Panel HG 09

The operator panel contains the pushbuttons and indicators shown in Figure 1-7 on page 1-20. The control logic for reading the keypad switches and writing data to the status indicators is contained on the planar board. The processor logic reads and writes to the operator panel via the PIO bus. The processor logic also interfaces with the operator panel adapter logic via the FRU ID bus.

Type 1 Communication Adapter (Models 81R and 91R) HG 11

The Type 1 communication adapter provides CCITT 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 planar board for connecting 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 protocol is 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 is attached.

Type 2 Communication Adapter (Models 82R and 92R) 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 planar board 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 is attached.

Terminal Adapter HG 26

The terminal adapter provides buffering and control for attachment of a maximum of eight display stations, printers, or workstations. The terminal adapter interfaces with the PIO bus. Each of the four Dual-Purpose Connectors (DPCs) provides a path to a single terminal. Port 0 also provides a path to eight terminals via a 3299 Terminal Multiplexer. Signals from port 0 contain addressing for as many as eight terminals. Signals from ports 1 through 3 contain an address for one terminal. If a 3299 is connected to port 0 on the terminal adapter, ports 1 through 3 are disabled. The distance that 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.

Note: Terminals with the Dual-Purpose Connector (DPC) have the driver/receiver circuitry that does not require the use of baluns. 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. The DPC connector on these terminals accepts coaxial cable and IBM Cabling System Type 1 and Type 2 cables; with the DPC-T3 Adapter, these terminals accept direct telephone wiring.

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.

Processor HG 87

The processor logic contains the controller microprocessor, a timer, a read-only storage (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 logic interfaces with the PIO, storage, and FRU ID buses. A red Light-Emitting Diode (LED) on the planar 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 HG 87

The storage logic consists of storage and switching logic that provide 1MB (Models 81R and 82R) or 2MB (Models 91R and 92R) of usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The storage logic interfaces with the storage bus. On the Models 91R and 92R the storage card is a FRU.

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. Hardware group numbers (see Table 1-3 on page 1-9) are assigned as follows:

- Hardware group numbers 01 through 50 are assigned to individual FRUs in the 3174 Establishment Controller, such as logic 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 logic on the planar board.
- 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	80	Test Monitor Functions
01	Diskette/File Adapter	81	Test All Setup Mode
08	Timer	82	Test All Installed Mode
09	Operator Panel	84	Reserved
11	Communication Adapter	87	Processor/Storage
26	Terminal Adapter	99	Unknown or unassigned

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	FRU
0000	Invalid or Unknown
9000	Empty card location
9001	Invalid card/condition
9113	Diskette Drive 1.2MB Models 81R and 82R
9160	Planar Board 81R (EIA/V.35) (1MB)
9161	Planar Board 82R (X.21) (1MB)
9401	Diskette Drive 2.4MB Models 91R and 92R
948x	Storage card 2MB Models 91R and 92R
9523	Operator Panel
9760	Planar Board 91R (EIA/V.35) (0MB)
9761	Planar Board 92R (X.21) (0MB)

Field Replaceable Unit Identification (FRU ID)

A diskette drive identifier is contained in the diskette drive signal cable. Two FRU ID modules are on the planar board to identify individual adapter logic and the planar board logic. During an IML, these modules send their FRU ID numbers to the processor logic. The FRU ID numbers are used to build the hardware configuration table, which is written on the Control diskette. This occurs every time an IML is performed. The hardware configuration table, shown in Figure 1-4 on page 1-10, can be displayed by using Online Test 2. See "Test 2: Configuration Menu" on page 2-92 or the offline test monitor, see "How to Display the Test Monitor Functions (HG 80)" on page 2-56.

```
                  _____ Hardware Configuration Table _____


 HG TYPE LC DESCRIPTION            SC     HG TYPE LC DESCRIPTION          SC
 00 9001 00 Invalid Card/Cond             09 9523 07 Ops Panel Assembly
 01 9113 01 Diskette 1 - 1.2MB   32XX     11 9160 03 Type 1 Com Adpt-XXX
 01 9160 03 File Adpt                     87 9160 03 Processor
 08 9160 03 Timer                         87 9160 03 Storage 2MB
 09 9160 03 Ops Panel Adpt




 Select Test; press Enter ====>_

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

Figure 1-4. Hardware Configuration Table

HG = Hardware group
TYPE = FRU type number
LC = Location
SC = Status code

Note: This panel shows the configuration for a 3174 Model 81R. The FRU type numbers may vary for different models of the 3174. Only those FRUs that are physically installed are displayed in this table. All the adapters that are listed with the same FRU type 9160 are contained on the planar board.

For the communication adapter, the XXX equals 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.
WRP = X.21 wrap plug is connected.
INV = An undefined cable or wrap plug is connected.

Status Codes

Status codes indicate the following:

- Controller failures
- Attached-terminal failures
- Communication link 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.

Status codes are displayed in four formats:

- A base status code two 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 Presentation

When the controller is operational, most status codes are displayed in the operator information area of the attached terminals. Some status codes are also 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 ten.

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 Adv pushbutton.

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 is displayed, 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) 9113 (B1B2) 0100 (B3B4)
3020 0101 (QAHG) 9113 (B1B2) 0100 (B3B4)
331 0211 (QAHG) 9160 (B1B2) 0300 (B3B4) 01 (B5)
```

1. When 381 is displayed, press the Adv pushbutton to stop scrolling.
2. Press Adv; 0101 is displayed.
3. Press Adv; 9113 is displayed.
4. Press Adv; 0100 is displayed.
5. Press Adv; four blanks are displayed.
6. Press Adv; four blanks are displayed.
7. Press Adv; 381 is displayed again.
8. 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 2-9 on page 2-56 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 Adv pushbutton 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) 9160 (TYPE) 0300 (LOCA) 9160 (TYPE) 0300 (LOCA)

1. At 3001, press Adv.
2. 0126 is displayed; press Adv.
3. 9160 is displayed; press Adv.
4. 0300 is displayed; press Adv.
5. 9160 is displayed; press Adv.
6. 0300 is displayed; press Adv.
7. Four blanks are displayed; press Adv.
8. Four blanks are displayed; press Adv.
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) 9160 (TYPE) 0300 (LOCA)
3001 0101 (QAHG) 9160 (TYPE) 0300 (LOCA)

1. 3001 is displayed on the operator panel.
2. Press Adv; 0111 is displayed.
3. Press Adv; 9160 is displayed.
4. Press Adv; 0300 is displayed.

5. Press Adv; four blanks are displayed.
6. Press Adv; 3001 is displayed.
7. Press Adv; 0101 is displayed.
8. Press Adv; 9160 is displayed.
9. Press Adv; 0300 is displayed.
10. Press Adv; four blanks are displayed.
11. Press Adv; four blanks are displayed.
12. Press Adv; the first 3001 status code is displayed.

Repeat these steps to redisplay each status code and their 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 Adv.

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 Log (HG 80)" on page 2-55.

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 planar board to identify failures that occur during processor logic instruction testing. These numbers appear only on the operator panel.

2xx

This number range is used to indicate permanent or temporary 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 all attached terminals and the operator panel. Some temporary failures are only 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 attached terminals 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 terminals or on the operator panel and are logged. Some temporary failures are only 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 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 display 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, or 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.

3174 Event Log

A nonvolatile event log is provided by the 3174. The event log is recorded on the Control diskette that resides in the diskette drive used to IML the controller. All 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. The log wraps when it is full. The oldest errors are overlaid. This log is reset only by using online test 4, option 2. Writing of log records occurs either when a diskette buffer sector of 512 bytes is full or immediately for critical faults. Figure 1-5 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.

```
                                  _____ Log Records - All _____

(Day/Time since last POR: 000/08:11)
Day   Time   SC   QA   PHG_PN   CHG_PN   LT    Extended data (B1-B16)
                                               B1   B3   B5   B7   B9   B11   B13   B15
0000  08:11  0331 51   11                      9160 0300 01
0000  00:05  0390 04   01
0000  00:03  0500 01   11
0000  00:02  0532 10   11
0000  00:02  3174 01   00
0015  21:48  0402 02   00_02   002       0000 0003 F350 0000
0015  21:22  0401 03   00_06   006       0001 0004 3C40 4000
0015  21:20  0209 51   26_07   007
0015  21:19  0201 51   26_07   007
0015  21:07  3174 01   00
0015  20:01  0311 01   87                    9160 0300

SC=Status Code    QA=Qualifier    HG=Hardware Group    PN=Port Number
PHG_PN=PrimaryHG_PN    CHG_PN=ConnectionHG_PN

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

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

Figure 1-5. Sample Event Log

In the example above, the Day/Time since the 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 was not a power-on IML.

At time 00:02, a 532 10 (SC QA) occurred immediately after IML completion, indicating the communication adapter (HG11) recognized that the communication link was idle. At time 00:03, the problem was cleared by host operator intervention and status code 500 01 was logged, indicating that status code 532 10 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 390 04 was logged, indicating a problem with the diskette media.

At time 08:11, status code 331 51 occurred on the communication adapter (HG = 11). This indicates that a controller-recoverable communication adapter PIO parity error occurred.

Note: Status code qualifiers (QA) above 50 indicate temporary conditions. The planar board type number is indicated by the 9160 in the extended data field, and 0300 indicates the planar board is in machine location 03. The 01 indicates the communication adapter on the planar is running on interrupt level 01.

In many cases it is necessary to determine the cause of 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, 9160 is the FRU type number and 03 indicates the location of the planar board.

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 07. One minute later, at time 21:20, status code 209 51 was logged for the same port, indicating that a recoverable terminal adapter command queue failure occurred. Both failures point toward possible coax noise problems.

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 that a data stream protocol problem was detected on the terminal connected to port 02. The status code and the qualifier indicate that the data stream contained an invalid (out-of-range) buffer 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 indicates 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 following example.

```
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
```

At time 21:22, another data stream problem occurred. Status code 401 03 indicates that the terminal connected to port 06 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 4 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 following example.

Data Stream Byte#	00	01	02	03	04	05	06
Structured 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)

Operational status codes that are logged and also 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

331 0211 9160 0300 0100

331 is displayed on the operator panel when the failure occurs.
Press Adv; 0211 is displayed.
Press Adv; 9160 is displayed.
Press Adv; 0300 is displayed.
Press Adv; 0100 is displayed.

331 = Status code
0211 = Status code qualifier (QA) and a hardware group number (HG)
9160 = The FRU Type number (TYPE)
03 = 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 shown in Example 1 is shown here 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 (B1-B16)
                                            B1   B3   B5   B7   B9   B11   B13   B15
 113   06:32  0331  02   11                 9160 0300 01



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=End                  8=Fwd          12=Test Menu
```

Where:

SC = Status Code = 0331
QA = Qualifier = 02
PHG_PN = Primary Hardware Group 11 (no PN associated with PHG 11) Extended Data:
9160 = TYPE
03 = LOCA
00 = Don't care
01 = Adapter interrupt level
00 = Don't care

Figure 1-6. Log Records Panel

Diskettes

The 3174 Establishment Controller uses 5.25-inch diskettes with the following characteristics:

- Double-sided
- Soft-sectored.
- 1.2MB capacity on Models 81R and 82R
- 2.4MB capacity on Models 91R and 92R

Blank diskettes must be P/N 6109660 (1.2MB) or P/N 72X6086 (2.4MB) or equivalent. These part numbers are for a box of ten.

The following 3174 diskettes are available:

- Utility diskette
- Control diskette
- RPQ diskette
- 3174 dump diskette.
- Limited Function Utility.

Utility Diskette

One Utility diskette is shipped with each machine. This diskette contains the microcode that supports the following functions:

- Copy Files
- Diagnostics
- Microcode Upgrade
- Identify Customizing Keyboard
- Configure
- Define Printer Authorization Matrix (PAM)
- Merge RPQs
- Modify Keyboards
- Patch.

Limited Function Utility Diskette

This diskette contains the microcode that supports the following functions. (Unless it was ordered by the customer, this diskette is not shipped with the machine.)

- Diagnostics
- Patch
- Copy Files
- Identify Customizing Keyboard.

Control Diskette

Two Control diskettes are shipped with each machine. These diskettes contain the operational microcode and enough microcode to test the processor and storage logic.

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.

3174 Dump Diskette

This diskette is available from an IBM Parts Distribution Center. It contains the microcode that supports dumping the controller storage.

Operator Panel

The operator panel contains indicators and function pushbuttons used by the IBM service representative for problem determination. For the locations of these items, see Figure 1-7, then see the descriptions that follow.

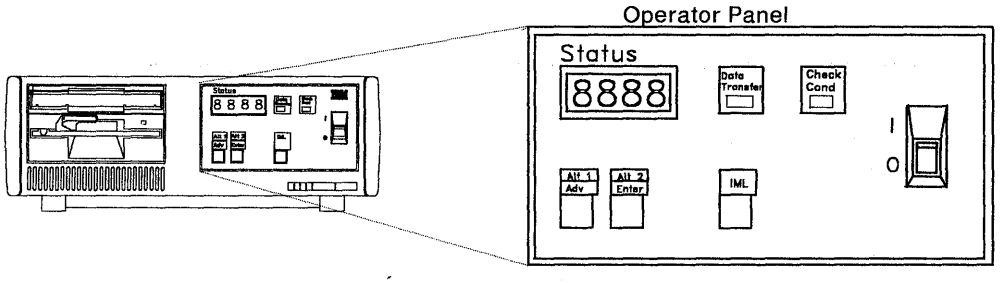


Figure 1-7. Operator Panel

Indicators

The 3174 has four Status indicators, a Data Transfer indicator, and a Check Cond indicator. These indicators are described in the following paragraphs.

Status Indicators: The four Status indicators display 1 – 9, 0, e, h, l, p, dashes, and blanks. The displayed output can be 3174 status codes, prompts, or input selections.

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

Check Cond Indicator: This LED is lit when the controller has an unrecoverable hardware or microcode failure.

Function Pushbuttons

The operator panel contains the following function pushbuttons:

- Alt 1 Adv
- Alt 2 Enter
- IML.

These pushbuttons are described in the following paragraphs.

Alt 1 Adv Pushbutton: The Alt 1 Adv pushbutton is a dual-purpose pushbutton. Used alone, the function of this pushbutton is to advance (step) the status indicators. Used in conjunction with the IML pushbutton, an Alt 1 IML is executed. Alt 1 Adv used alone (without the IML pushbutton) has two functions:

1. To display the extended fields of status codes or to display multiple status codes
2. To display numerical menu lists during offline test selection at the operator panel.

Displaying Status Codes: If a status code is displayed, pressing the Adv pushbutton causes the extended fields of the status code to be displayed (if any). Press Adv as many times as necessary to display the entire status code.

Displaying Numerical Menu Lists: During offline operations, such as running tests, the Adv pushbutton is used to step through the sequential lists of test numbers, test parameters, function numbers, and function parameters until the desired number is displayed in the status indicators.

When Alt 1 is used in conjunction with the IML pushbutton, an Alt 1 IML is executed and the following functions can be selected:

- Terminal Mode, Master Menu displayed on the terminal attached to port 0
- Test All Functions (Control or Utility diskette installed)
- Basic Tests (Utility diskette installed).

Alt 2 Enter Pushbutton: The Alt 2 Enter pushbutton is a dual-purpose pushbutton. Used alone, the function of this pushbutton is to display pending status codes, select tests, and start test or function execution. Used in conjunction with the IML pushbutton, an Alt 2 IML is executed.

Displaying Pending Status Codes: Once a status code is displayed at the operator panel, the code remains displayed for one hour unless operator intervention occurs. After one hour passes, the status indicators are erased. The status code is displayed again by pressing the Enter pushbutton.

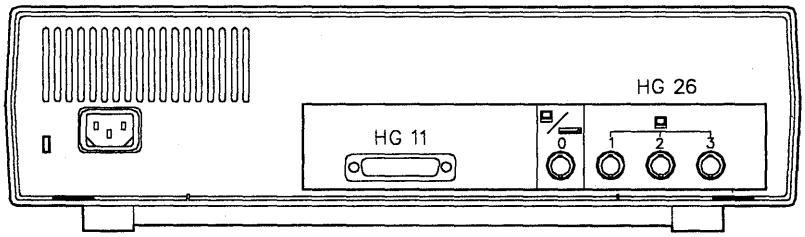
Selecting Tests: When tests are being selected, the test number is first displayed in the status indicators by use of Adv. The test selection is then selected by pressing the Enter pushbutton. Once the entire test number is selected, pressing the Enter pushbutton causes that test request to execute.

When the Alt 2 pushbutton is used in conjunction with IML, diagnostic tests run on the FRUs present in the controller if the Utility diskette is installed. Successful completion is indicated by status code 2082. If the Control diskette is installed, diagnostics run on the processor and storage logic. Successful completion is indicated by status code 2587.

IML Pushbutton: When pressed, this pushbutton performs an indicator test (8888 is displayed in the Status indicators, Data Transfer and Check Cond indicators light). When it is released, all indicators go off, a reset occurs, and an IML starts from the diskette drive.

AC Indicator

The AC indicator is located at the rear of the controller. This indicator comes on when the AC power cable is plugged into a working power outlet. The AC indicator is located on the rear panel next to the AC power cable connector. See Figure 1-8.



AC Indicator

Figure 1-8. 3174 Rear Panel

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 powered on (power on IML). IML is completed when 3174 appears in the Status indicators. If a failure occurs during any portion of the IML sequence, a status code is displayed on the 3174 operator panel. During a normal IML, the following tests run:

1. Processor ROS tests
2. File adapter pretest

3. Storage tests
4. Extended processor tests.

A normal IML takes approximately 3 minutes to complete. 3174 appears in the status indicators if the host connection is active.

Alt 1 IML Description

This section contains 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. A configured Control diskette must be inserted in the diskette drive. During an Alt 1 normal IML, the following tests run:

1. Processor ROS tests
2. Storage
3. File adapter pretest
4. Extended processor tests.

Chapter 2 contains step-by-step procedures for running offline tests. For information about customizing, see the *3174 Planning Guide*.

Before starting an Alt 1 IML, note the following:

- If the function selection number being used is 41, a Control diskette is required.
- If the function selection number being used is 40, 80, 81, 82, or 87, a Utility diskette is required.

Table 1-5 shows the function selection numbers that can be selected from an Alt 1 IML.

Table 1-5. Alt 1 IML Selections

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) Note 3.
	=	82	= Test All (Installed Mode) (same as Alt 2 IML) Note 4.
	=	84	= Reserved
	=	87	= 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. Test function 80, 81, 82, or 87 can be selected in response to the 40 prompt message. Individual tests are selected after obtaining the 4001 prompt message.
2. 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 2-77 and "V.35 Cable Wrap Test (One Test/Oper Switch)" on page 2-77.
3. Test 81 (CSU) is normally performed at customer setup time. You must do the following before you run this test:

   Disconnect all external terminal signal cables from the terminal adapter ports except port 0. Attach a communication interface cable with the Test/Oper switch set to the Test position. A wrap plug (branch office tool) is available that can be used instead of the communication interface cable.
4. Test 82 should be run to test the controller if failures occur after the controller has been installed.

Alt 1 Normal IML Procedures

Two procedures can be used to perform an Alt 1 Normal IML. Use Procedure 1 if the controller is powered on. Use Procedure 2 if the controller is powered off.

Alt 1 Normal IML Procedure 1

1. Press and hold Alt 1.
2. Press and release IML.
3. 31 is displayed.
4. At 31, release Alt 1.
5. At 40, press Adv until 41 is displayed.
6. At 41, press Enter.

Alt 1 Normal IML Procedure 2

1. Press and hold Alt 1.
2. Switch power on, 31 is displayed.
3. At 31, release Alt 1.
4. At 40, press Adv until 41 is displayed.
5. At 41, press Enter.

Alt 2 IML (Test 82) Description

Test 82 is used for running extended tests. The following tests are executed:

1. Processor ROS tests
2. Storage
3. File adapter pretest
4. Extended tests load from the diskette
5. Extended processor instruction tests (HG 87)
6. File adapter tests (HG 01)
7. Extended timer tests (HG 08)
8. Communication adapter tests (Models 81R, 82R, 91R, and 92R) (no wrap tests) (HG 11)
9. Terminal adapter tests (no wrap tests) (HG 26).

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 a test error log and are displayed at the end of the test for analysis. An Alt 2 takes from 1 to 3 minutes.

Alt 2 IML (Test 82) Procedure

To perform a Test 82, use the following procedure:

1. Insert a Utility diskette into the diskette drive.
2. Press and hold Alt 2.
3. Press and release IML.
4. 31 is displayed.
5. Release Alt 2.

   The test runs 1 to 3 minutes. The Status indicators display the following codes during the adapter portion of the testing, where HG is the hardware group being tested:

   21HG = Test in progress
   22HG = Test in progress
   2082 = Test completed
   29HG = Test failed.

   For all other status codes, see the *3174 Status Codes*.
6. To bypass an error, if one occurs, press Enter (*Free* function).
7. To return to normal operation insert the Control diskette into the diskette drive and press IML.

Central Site Change Management

Central Site Change Management (CSCM) is a two-part process provided by microcode release 4.0 and above.

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

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

The following types of microcode can be distributed:

- Configuration data
- Request for Price Quotation (RPQ) Merge
- Down Stream Load (DSL)
- Keyboard Definition Utility (KDU)
- Patch
- Asynchronous Emulation Adapter (AEA) Data
- Printer Authorization Matrix (PAM).

3174 IML Selections for CSCM

CSCM provides the ability to have more than one level of microcode or configuration data installed in a 3174 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 diskette drive.

Alt 1 selection 41

This IML loads the production-level data objects from the diskette drive.

Alt 1 selection 42

This IML loads the back-level data objects from the diskette drive.

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 diskette drive.

If a on-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.*

Environmental Information

This section provides some of the environmental classifications and tolerances for the 3174 Establishment Controller. If an environmental problem is suspected, contact your local 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 = B1
- 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 Dba output is 46 Dba.

Special Tools

The following tools are available for wrap tests on the communication adapter in the 3174 Establishment Controller. These tools are available from the branch office or through normal parts distribution.

- EIA/V.35 wrap plug
- X.21 wrap plug
- V.35 wrap plug (shipped with the controller).

  Note: This wrap plug is shipped only with early-production machines.

See "How to Run Communication Adapter Optional Tests HG 11" on page 2-46 for details about using the communication adapter wrap plugs.

EIA/V.35 Wrap Plug

The EIA/V.35 wrap plug (P/N 6423419) is used to test the type 1 communication adapter. See Figure 1-9. This wrap plug can be connected on the end of the EIA cable, and the V.35 cables that have three Test/Oper switches.

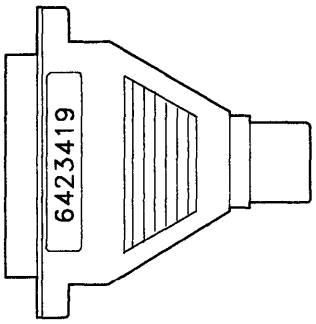


Figure 1-9. EIA/V.35 Wrap Plug

X.21 Wrap Plug

The X.21 wrap plug (P/N 6423420) is used to test the type 2 communication adapter. See Figure 1-10. This wrap plug can be connected directly to the communication port on the planar board, or on the X.21 interface cable.

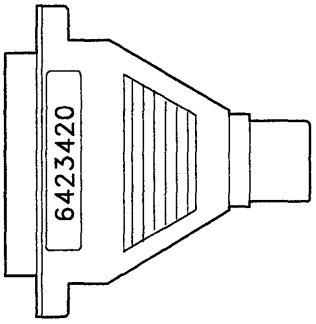


Figure 1-10. X.21 Wrap Plug

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. See Figure 1-11. This wrap plug can be connected on the end of the interface cables that have one Test/Oper switch.

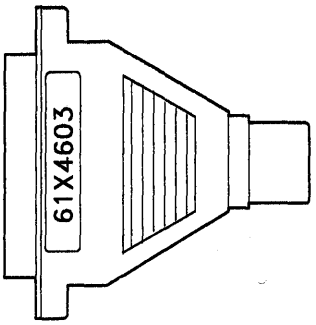


Figure 1-11. V.35 Wrap Plug

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Introduction

This chapter contains the charts used for 3174 problem determination, the maintenance analysis procedures (MAPs) to which you are directed in the charts, offline and online tests, general procedures, and 370/OLTs.

Start

Symptom Chart

Use the following chart and match your symptom to a symptom in the chart. Perform the recommended action for that symptom.

No.	Symptom	Action
1	Status code.	See the *3174 Status Codes* manual. **Note:** If the status code is not found go to "MAP 0110: Operator Panel Isolation" on page 2-8.
2	Check Cond indicator is on and the status indicators are blank.	Go to "MAP 0100: Check Condition Ind Is On with Blank Status Indicators" on page 2-6.
3	Status code not indicated or known.	Go to "MAP 0120: Status Code Not Indicated or Known" on page 2-10.
4	Any operator panel failure such as key function, prompt message, status code, and indicators.	Go to "MAP 0110: Operator Panel Isolation" on page 2-8.
5	Terminal adapter device(s) failing.	Go to "MAP 0200: Terminal(s) Problem Entry" on page 2-11.
6	All problems between the host and the 3174.	Go to "MAP 0300: Host Communication Failure" on page 2-27.
7	An IML does not start.	Go to the "MAP 0400: Power Load Isolation" on page 2-31.
8	An IML fails only after power is switched on. The status indicators may contain one of the following: • Blanks • 8888 • Any other status code.	Replace the power supply.
9	Fan is not turning.	1. Disconnect and reseat the fan power connector. 2. Disconnect the fan power connector and measure for +12 Vdc. If the voltage is correct, replace the fan. If the voltage is missing, go to step 005 of "MAP 0400: Power Load Isolation" on page 2-31.
10	Status Code 8888.	Go to MAP 0500.
11	Other problems.	Use your support structure for aid.

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

MAP 0100: Check Condition Ind 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.)

001

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

Are the status indicators blank?

Yes **No**

002

– Use the status code. See the *3174 Status Codes* manual.

003

– While pressing the IML switch, verify that the Status indicators light with an 8888 code.

Is 8888 **displayed?**

Yes **No**

004

– Exchange the operator panel assembly.
– Exchange the planar board assembly.

005

– Perform an Alt 2 IML. See "Alt 2 IML (Test 82) Procedure" on page 1-24.

Is 2082 **displayed?**

Yes **No**

006

– Use the status code. See the *3174 Status Codes* manual.

007

Is the Check Cond indicator still on?

Yes **No**

008

– Go to Step 010 on page 2-7.

009

– Exchange the planar board assembly.

(Step **009** continues)

009 (continued)
- Exchange the operator panel assembly.
- The 3174 hardware or microcode is in a hung state. Use your support structure for aid.

010

(From step 008)
- Insert the Control diskette.
- Switch power off and then on.

Did the power-on start the IML?

Yes **No**

011

- Replace the power supply.

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

012

- Resume normal operation.

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 assembly. • Defective planar board assembly.

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

– While pressing the IML switch, verify that the Status indicators light with an 8888 code.

Is 8888 **displayed?**

Yes **No**

002

– Exchange the operator panel assembly.
– Exchange the planar board assembly.

003

– Insert the Utility diskette (diagnostic).
– Perform an Alt 1 IML (momentarily pressing the IML switch while holding the Alt 1 switch).

Is 40 **displayed?**

Yes **No**

004

– Exchange the operator panel assembly.
– Exchange the planar board assembly.

005

Perform the following at the operator panel. If the results are not as expected, return to step 1. If the same operation fails again, take the **No** path at the end of this MAP step.

– Press Adv until 80 is displayed.
– Press Enter to select the 80 function; 80 - - is displayed.
– Press Enter; 4001 is displayed.
– Press Adv until 09 is displayed.
– Press Enter to select Test 09; 09 - - is displayed.
– Press Enter; 4506 is displayed.

(Step **005** continues)

005 (continued)

Is 4506 **displayed?**

Yes **No**

006

- Exchange the operator panel assembly.
- Exchange the planar board assembly.

007

1. Press Adv to step through the following list of characters:

   Note: Each time Adv is pressed, the following should occur on the operator panel:

   a. The data transfer indicator comes on for about 1 second.
   b. The correct 4 characters are displayed in the status indicators.
   c. After about 5 seconds the Check Cond indicator comes on and stays on until Adv is pressed again.

   0 0 0 0
   1 1 1 1
   2 2 2 2
   3 3 3 3
   4 4 4 4
   5 5 5 5
   6 6 6 6
   7 7 7 7
   8 8 8 8
   9 9 9 9
   - - - -
   E E E E
   H H H H
   L L L L
   P P P P
   Blank status indicators

2. Press Enter.

Is 2009 **displayed?**

Yes **No**

008

- Exchange the operator panel assembly.
- Exchange the planar board assembly.

009

- Insert the Control diskette and press IML.

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 the status code is not known.	• Status code is indicated at the failing display. • Status code is stored in the 3174; use test 1 event log.

001

- Try to obtain a status code by the following:
- Check for a status code in the operator information area on a terminal.
- At a working 3278 (or equivalent) display, run Test 1 (option 2). See "Test 1: Display Logs Menu" on page 2-86.

Did you find a status code?

Yes **No**

002

- Continue with the next symptom in the Initial Symptom Chart.

003

- Use the *3174 Status Codes* manual for the repair action.

MAP 0200: Terminal(s) Problem Entry

Warning: Before swapping any cables, see "Device Signal Cable Connectors" on page A-6 for a description of potential cable connector mismatch problems.

001

Use the following chart and match your terminal(s) failure(s) with one of the symptoms in the chart. Take the action specified for that symptom.

Symptom	Action
All attached terminals are failing.	Go to Step 002.
One or more attached terminals failing.	Go to "MAP 0210: Terminal Adapter Isolation" on page 2-12.
Symptom not known.	Run the status summary test (/3) (see "Test 3: 3270 Device Status Information" on page 2-94) 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 (Test 82) Procedure" on page 1-24.

Is 2082 **displayed?**

Yes **No**

003

– Use the status code. See the *3174 Status Codes* manual.

004

Further isolation is required. Go to "MAP 0210: Terminal Adapter Isolation" on page 2-12.

MAP 0210: Terminal Adapter Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal(s) failing.	• Defective planar board. • Defective terminal adapter output cable at one of its ports (0−3).

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 swapping any cables, see "Device Signal Cable Connectors" on page A-6 for a description of potential cable connector mismatch problems.

001

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

002

- To identify the failing port, use:
  1. The Subsystem Cabling Worksheets.
  2. Online Test 3. See "Test 3: 3270 Device Status Information" on page 2-94.
- Then continue with Step 003.

003

(From step 002)
- If the terminals that are directly attached to the 3174 ports 1 through 3 are the only terminals failing, find out if a 3299 is attached to port 0. See Figure 1-2 on page 1-5 and Figure 1-3 on page 1-6.
- If a 3299 is attached to port 0, ports 1 through 3 are disabled.
- Run a wrap test to the failing terminal adapter port.
- Use online test 10, option 1,xx (xx=00−03). See "Test 10: Port Wrap Tests" on page 2-116.
- If unable to run the wrap test online, use the offline method. See "How to Run Terminal Adapter/3299 Optional Tests HG 26" on page 2-78.
- Use the status code on the terminal or the operator panel to verify the wrap test results. See the *3174 Status Codes* manual.

Does the status code indicate a failure?
Yes **No**

004

- Go to "MAP 0220: Terminal Attachment Configuration Chart" on page 2-14 and continue problem isolation.

005

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

- Disconnect the failing port's output cable at the terminal adapter port. See Figure 1-3 on page 1-6.
- Perform the wrap test on the failing port again.

(Step **005** continues)

005 (continued)
Does the failure still occur?

Yes **No**

006

- Reconnect the port output cable.
- Go to "MAP 0220: Terminal Attachment Configuration Chart" on page 2-14 and continue problem isolation.

007

- Replace the planar board.
- Insert the Control diskette and press IML.

MAP 0220: Terminal Attachment Configuration Chart

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

001

Use the following chart and match your failing terminal symptom and its cable to one of the attachments in the chart. Take the appropriate action.

Symptom	Action
Terminal(s) attached to a 3299 Model 2 or a 3299 Model 3 (wrappable).	Go to "MAP 0230: 3299 Models 2 and 3 Isolation" on page 2-15.
Terminal(s) attached to a 3299 Model 1 (nonwrappable).	Go to "MAP 0240: 3299 Model 1 Isolation" on page 2-20.
Terminal attached directly to a 3174 port.	Go to "MAP 0250: Terminal Isolation" on page 2-25.

MAP 0230: 3299 Models 2 and 3 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal or terminals attached to a 3299 Model 2 or 3299 model 3 fail. 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. • The attached terminal is failing. • The attached terminal signal cable is failing. • Replacing a 3299-2 or 3299-3 with a 3299-1. • Multiple terminals and signal cables are 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: Before swapping any cables, see "Device Signal Cable Connectors" on page A-6 for a description of potential cable connector mismatch problems.

001

Do you know which terminal or terminals are failing?

Yes **No**

002

- Run test 3 to obtain the status of all attached terminals, or get more information from the customer about the failure. See "Test 3: 3270 Device Status Information" on page 2-94.
- Continue with Step 003.

003

(From step 002)
Is more than one terminal attached to the same 3299 failing?

Yes **No**

004

- A single terminal attached to the same 3299 is failing. Note the failing port number, and go to Step 023 on page 2-17.

005

Are all terminals that are attached to the same 3299 failing?

Yes **No**

006

- Some terminals attached to the same 3299 are failing. Go to Step 023 on page 2-17.

007

(Step **007** continues)

007 (continued)

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 1-6.

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 with the same model.

009

Are eight terminals attached to the same 3299?

Yes **No**

010

– Go to Step 016.

011

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

Yes **No**

012

– Go to Step 035 on page 2-18.

013

– Swap the 3299 with the spare.

Does the failure still occur?

Yes **No**

014

– Notify the customer that the original 3299 is failing.
– Insert the Control diskette and continue normal operations.

015

The 3299 input cable is defective.

016

(From step 010)

Note: 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 port locations and *stop testing* at the first good port. Run the online test 10 option 2,xx (00–07). See "Test 10: Port Wrap Tests" on page 2-116.
– If unable to run the wrap tests online, use the offline method. See "How to Run Terminal Adapter/3299 Optional Tests HG 26" on page 2-78.
– Use the status code on the terminal or the operator panel to verify the wrap test results. See the *3174 Status Codes* manual.

(Step **016** continues)

016 (continued)

Did all eight ports fail the wrap test?

Yes **No**

017

– Reconnect the 3299 output cables. Go to Step 040 on page 2-19.

018

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

Yes **No**

019

Go to Step 035 on page 2-18.

020

– Swap the 3299 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.
– Insert the Control diskette and press IML.
– Continue normal operations.

022

– Reconnect the 3299 output cables.
– Insert the Control diskette and press IML.

The 3299 input cable is defective.

023

(From steps 004 and 006)

–

Note: Isolate the failure to the 3299 or to the terminal and its input cable.

– Run the wrap test to the failing 3299 port location (run the online test 10 option 2,xx (00-07).
– If unable to run the wrap test online, use the offline method. See "How to Run Terminal Adapter/3299 Optional Tests HG 26" on page 2-78.
– Use the status code on the terminal or the operator panel to verify the wrap test results. See the *3174 Status Codes* manual.

Does the status code indicate a failure(s)?

Yes **No**

024

Go to "MAP 0250: Terminal Isolation" on page 2-25.

025

(Step **025** continues)

025 (continued)

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

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

Does the wrap test still fail?

Yes **No**

026

- Reconnect the 3299 output cable(s). Go to "MAP 0250: Terminal Isolation" on page 2-25.

027

Is the failing terminal 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 2-19.

029

- Verify that the input and output cables are correctly attached to the 3299. See Figure 1-3 on page 1-6.

Is the 3299 red indicator on?

Yes **No**

030

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

031

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

Yes **No**

032

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

033

- Swap the 3299 with the spare, but do not connect the output cable(s).
- Run the wrap test again.

Does the failure still occur?

Yes **No**

034

- Insert the Control diskette.
- Continue normal operation.

035

(From steps 012, 019, and 032)

- Reconnect the 3299 output cable(s) if previously disconnected.

(Step **035** continues)

035 (continued)

Note: Isolate the failure to the 3299 or its input cable.

- Attach the 3299 input cable to a working 3278 or equivalent terminal and check for a READY indication. A READY indication will display either an S, 4, or 6 in the operator information area of the terminal.
- If offline, insert the Control diskette and do a normal IML to load the operational code.

Is a ready indication displayed (S, 4, or 6) 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

- Insert the Control diskette.
- Continue normal operations.

039

Further isolation is required. Go to "MAP 0250: Terminal Isolation" on page 2-25.

040

(From steps 017 and 028)

Note: Isolate the failure to the 3299 or to the terminal and its input cable.

- At the 3299, move the failing port location's cable to a working port location and check for a READY indication. A READY indication will display either an S, 4, or 6 in the operator information area of the terminal.
- If offline, insert the Control diskette and do a normal IML to load the operational code.

Warning: When you are swapping terminal cables and the terminals 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**

041

The 3299 is defective. It must be replaced with the same model.

042

Further isolation is required. Go to "MAP 0250: Terminal Isolation" on page 2-25.

MAP 0240: 3299 Model 1 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal or Terminals attached to a 3299 Model 1 (nonwrappable) fail. 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. • The attached terminal is failing. • The attached terminal signal cable is failing. • Multiple terminals and signal 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.)

Warning: Before swapping any cables, see "Device Signal Cable Connectors" on page A-6 for a description of potential cable connector mismatch problems.

001

Do you know which terminal or terminals are failing?
Yes **No**

002

- Run test 3 to obtain the status of all attached terminals, or get more information from the customer about the failure. See "Test 3: 3270 Device Status Information" on page 2-94.
- Then continue with Step 003.

003

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

004

A single terminal attached to the same 3299 is failing. Note the failing port number, and go to Step 019 on page 2-22.

005

(Step **005** continues)

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

006

Some terminals attached to the same 3299 are failing. Go to Step 028 on page 2-23.

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 1-6.
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 with the same model.

009

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

010

– Go to Step 014.

011

– Swap the 3299 with the spare 3299.
Does the failure still occur?
Yes **No**

012

– Continue normal operations.

013

The 3299 input cable is defective.

Note: Also consider the possibility of multiple-terminal problems.

– Further isolation is required. Go to Step 031 on page 2-23.

014

(From steps 010 and 024)
–

Note: Isolate the failure to the 3299 or its input cable.

– Attach the 3299 input cable to a working display or similar terminal and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-169.
– If offline, insert the Control diskette and perform a normal IML to load the operational code.
(Step **014** continues)

014 (continued)
Is a ready indication displayed (S, 4, 6) 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 0250: Terminal Isolation" on page 2-25.

019

(From step 004)
Is the failing terminal the only one attached and configured with this 3299 Model 1?
Yes **No**

020

Go to Step 028 on page 2-23.

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 1-6.

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

022

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

023

(Step **023** continues)

023 (continued)
Do you have a spare 3299 that is the same model as the suspect 3299?
Yes **No**

024

– Go to Step 014 on page 2-21.

025

– Swap the 3299 with the spare 3299.
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 terminal problem.

Further isolation is required. Go to Step 031.

028

(From steps 006 and 020)
Isolate the failure to the 3299 or to the terminal and its input cable.
– At the 3299, move the failing port location's cable to a working port location and check for a READY indication. A READY indication will display either an S, 4, or 6 in the operator information area of the terminal.
– If offline, insert the Control diskette and perform a normal IML to load the operational code.

Warning: When you are swapping terminal cables and the terminals 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 0250: Terminal Isolation" on page 2-25.

030

– Replace the 3299.

031

(From steps 013 and 027)
– Attach the 3299 input cable to a working display or similar terminal and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-169.
– If offline, insert the Control diskette and do a normal IML to load the operational code.
(Step **031** continues)

031 (continued)

Is a ready indication displayed (S, 4, **or** 6**) in the operator information area?**

Yes **No**

032

The 3299 input cable is defective.

033

Further isolation is required. Go to "MAP 0250: Terminal Isolation" on page 2-25.

MAP 0250: Terminal Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A terminal symptom or status code has indicated that a terminal is not READY. The terminal may be a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on the terminal is usually a customer responsibility. This MAP has been included to help you do subsystem PD when a terminal or terminals are involved.	• The attached terminal is failing. • The terminal signal cable is defective. • Defective planar board. • Defective 3299-1, 3299-2, or 3299-3. • A Personal Computer is attached to port 0. **Note:** This MAP isolates the terminal 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: Before swapping any cables, see "Device Signal Cable Connectors" on page A-6 for a description of potential cable connector mismatch problems.

001

- If you cannot customize, and a Personal Computer (PC) is attached, verify that the PC 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 terminals to a single wall receptacle).

Has problem determination on the attached terminal been done?

Yes **No**

002

- Use the attached terminal documentation to do problem determination on the terminal.
- If the problem is fixed by doing problem determination of the attached terminal, then End.

003

Has the failing terminal been exchanged with a working display or similar terminal?

Yes **No**

004

- Go to Step 006 on page 2-26.

005

(From step 006)
Then the problem is isolated to the failing terminal signal cable.

Note: If the problem is not isolated, then replace the 3299 or the 3174 planar board.

006

(From step 004)

- Exchange the failing terminal with a working display or similar terminal. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-169.
- If offline, insert the Control diskette and perform a normal IML to load the operational code.
  - If the READY condition is on, then the 3174 port location is not at fault and the disconnected terminal is failing.
  - If the READY condition is off, restore the terminal and cable and continue with Step 005 on page 2-25.

Note: If the problem is not isolated, then replace the 3299 or the 3174 planar board.

MAP 0300: Host Communication Failure

Symptom Explanation	Conditions That Could Cause This Symptom
Host communication failure (Models 81R, 82R, 91R, and 92R).	• Customizing response. • No AC power to modem. • Defective I/O cable. • Improperly installed I/O cable. • Defective modem. • 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 (Test 82) Procedure" on page 1-24.

Is 2082 displayed?

Yes **No**

002

– Use the status code. See the *3174 Status Codes* manual.

003

Did the problem occur after the 3174 had been working?

Yes **No**

004

– Use Online Test 2 Customizing Menu to verify that the customizing response numbers are proper for your 3174 options and host link attachment. See "Test 2: Configuration Menu" on page 2-92.
– Continue with Step 005.

005

(From step 004)
Is the attachment a V.35 interface? Determine by checking cable part numbers. See Chapter 5.

Yes **No**

006

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

007

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

  • Three switch positions. Set the switch to Test Mode 1 as shown in Table 2-6 on page 2-48.
  • One or two switch position. See "V.35 Cable Wrap Test (One Test/Oper Switch)" on page 2-77 and do the three steps of the procedure.

(Step **007** continues)

007 (continued)
(ENTRY POINT A)

- Perform an Alt 1 IML to display the 40 prompt message. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
- Press Enter. Use the terminal connected to port 0.
- Key in **4** and press Enter. The diagnostic test menu is displayed.
- Key in **1101** and press Enter.
- If a terminal is not available to perform offline tests, run the test from the operator panel. See "How to Run Communication Adapter Optional Tests (HG 11)" on page 2-75.

Is 2011 displayed?

Yes **No**

008

- Press Adv to see the extended information from the status code. Match the code xx11 number to one of the following codes.

0211 (cable or wrap plug not connected)

- Check that the modem cable is plugged into the 3174 communication socket labeled HG 11.
- Check that the modem cable is the correct part number. See Chapter 5.
- Replace the planar board assembly.

0311 (cable or wrap plug not providing proper X.21 attachment)

- Check that the cable is not an EIA part number. See Chapter 5.
- Exchange the X.21 cable.
- Exchange the planar board assembly.

2x11 (cable wrap failure; the planar board assembly, modem cable, or wrap plug is defective, or the modem cable or wrap plug part number being used is incorrect)

- See code 3030 in the *3174 Status Codes* manual. Verify if the 2x code is a cable or wrap plug part number compatibility problem. See Chapter 5.
- If you want to isolate the problem to the ***planar board assembly*** or ***cable***, run the wrap test with the wrap plug. For the part number, see Figure 2-5 on page 2-49, Figure 2-6 on page 2-50, or Figure 2-7 on page 2-51.
- Install the wrap plug and run the wrap test as previously done in step 007.

009

Is the 3174 a Model 81R or 91R (EIA/V.35 interface)?

Yes **No**

010

Go to Step 020 on page 2-29.

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 2-6 on page 2-48 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 and continue.
- Set the communication cable Test/Oper switch back to **Oper**.
- To run the modem status test, key in **1104** and press Enter.

Is the status code 4513?

Yes **No**

012

- Match the failing status code to one of the following and take the appropriate action.

(Step **012** continues)

012 (continued)
4510 (missing 'data set ready' and 'carrier detect')
- The status code shows 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. See Figure 2-5 on page 2-49, Figure 2-6 on page 2-50, and Figure 2-7 on page 2-51.

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) in Step 13 of this MAP.

4512 (missing 'data set ready' and active 'carrier detect')
- The status test shows that the modem is causing the problem. Go to (ENTRY POINT B) in Step 13 of this MAP.

013

The planar board assembly is receiving 'data set ready' and your link is providing the 'carrier detect' signal.

(ENTRY POINT B)

Is the connection to an IBM modem?

Yes **No**

014

The modem or the communication link is causing the problem.

015

Is the modem wrappable?

Yes **No**

016

The modem or the communication link is causing the problem.

017

- The Test/Oper switch is still set to Oper.
- Run the modem wrap test with the modem clock. Key in **1102** and press ENTER.

Is 2011 **displayed?**

Yes **No**

018

- 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)
(Step **020** continues)

020 (continued)

- The Test/Oper switch is still set to Test.
- Perform an Alt 1 IML to display the 40 prompt message. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
- Press Enter. Use the terminal connected to port 0.
- Key in **4** and press ENTER. The diagnostic test menu is displayed.
- To run the cable wrap test with the modem clock, key in **1105** and press ENTER.
- If a terminal is not available to perform offline tests, run the test from the operator panel. See "How to Run Communication Adapter Optional Tests (HG 11)" on page 2-75.

Is 2011 **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.
- Insert the Control diskette into the diskette drive.

MAP 0400: Power Load Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The Status, Data Transfer and Machine Check Indicators are off. Cannot perform an IML and the 3174 is inoperative.	• AC power incorrect or missing. • One or more power distribution plugs loose or unplugged. • Defective power supply. • Defective diskette drive. • Defective operator panel assembly. • Defective fan. • Defective planar board.

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 translations of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

- Press and hold IML.
- Switch power on and release IML.
- Status Indicators display progress messages.

Are Status Indicators off?

Yes **No**

002

- Resume normal operations. (If Status Code is displayed, see the *3174 Status Codes* manual.)

003

- Check that the green AC indicator on the rear panel, adjacent to the power cord, is lit. See the "Locations" section in Chapter 3.

Is the AC Indicator on?

Yes **No**

004

- Switch power off.
- 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 cord configurations, it may be easier to measure input power at the 3174 power cord end.

- Check the 3174 power cord for defects; replace as required.
- Replace the power supply.

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

005

– Disconnect the following plugs (see Figure 3-5 on page 3-6):

- Diskette drive plugs P1 and P2
- Fan plug P3.

– Switch power on.

Are the Status Indicators still off?

Yes **No**

006

– Connect the plugs that were disconnected, one at a time, and switch power on after you connect each plug.

Note: After powering **off**, wait at least 2 seconds before powering on. The Status Indicators should go **off** again and remain **off** when you connect the **failing** component cable plug.

– Replace the failing component.

007

– Switch power off.
– Disconnect Operator Panel plug P10.
– Switch power on.
– Measure the voltage at:

- J10-10A to J10-5B (GND) +5V
- J10- 9A to J10-5B (GND) +1.7V
- J10-10B to J10-5B (GND) +5V

– See Figure 3-4 on page 3-5.

Is the voltage missing?

Yes **No**

008

– Replace the Operator Panel.

009

The power supply is designed to operate while disconnected from the planar board.

– Switch power off.
– Disconnect the power supply cable plug P1.
– Switch power on.
– Measure the voltage at:

P1-1 to P1-4 (GND) +5V
P1-3 to P1-4 (GND) -5V
P1-8 to P1-4 (GND) -12V
P1-9 to P1-4 (GND) +12V

– See Table 3-1 on page 3-3.

(Step **009** continues)

009 (continued)

Are the voltages present from the power supply?

Yes **No**

No → **010**

- Replace the power supply.

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

Yes → **011**

- Switch power off.
- Reconnect the power supply cable plug P1 and Operator Panel Plug P10.
- Reconnect removed plugs.
- A planar board voltage short is indicated; inspect for possible shorts before replacing.

MAP 0500: Status Display 8888

Symptom Explanation	Conditions That Could Cause This Symptom
8888 in the Status Display	• System reset is being held active. • Defective power supply. • Defective planar board. • Defective operator panel.

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

- See if status code 8888 is displayed after a power-on and then while pressing the IML switch.
- If the 8888 code occurs only after a power-on, exchange the power supply.

  Note: The power supply is designed to operate while disconnected from the planar board.

- Switch power off.
- Remove the covers. See "Cover Removal/Replacement" on page 3-7.
- Unplug the P1 Planar power connector. See Figure 3-5 on page 3-6.
- At the P1 connector, connect the (+) meter lead to P1-6 and the (-) meter lead to P1-4. See Figure 3-3 on page 3-4.
- Switch power on and check that the meter starts moving after a slight delay and goes to approximately +5 volts DC.

Does the meter measure approximately +5 volts DC?
Yes **No**

002

- Replace the power supply.

003

- Turn power off.
- Reconnect the P1 Planar power connector.
- Disconnect the P10 Operator Panel cable connector. See Figure 3-5 on page 3-6.
- At the P1 Planar power connector, wire side, connect the (+) meter lead to P1-6 and the (-) meter lead to P1-4. See Figure 3-3 on page 3-4.
- Turn power on.

Does the meter measure approximately 0 volts DC?
Yes **No**

004

- Replace the operator panel.

005

- Turn power off.
- Reconnect the P10 Operator Panel cable connector.
- Disconnect the diskette drive P2 cable connector. See Figure 3-5 on page 3-6.

(Step **005** continues)

005 (continued)

- At the P1 Planar power plug, wire side, connect the (+) meter lead to P1-6 and the (-) meter lead to P1-4. See Figure 3-3 on page 3-4.
- Turn power on.

Does the meter measure approximately 0 volts DC?

Yes **No**

No → **006**

- Replace the diskette drive.

Yes → **007**

- Turn power off.
- Reconnect the diskette drive P2 cable connector. See Figure 3-5 on page 3-6.
- Replace the planar board. See "Planar Board Removal" on page 3-11.

Diagnostic Aids: Offline Tests

Offline tests are started from the 3174 operator panel and are 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 in the diskette drive. Offline tests are of three major types:

- Hardware Group Test Alls and Processor/Storage Test (81, 82, 87)
- Hardware Group Basic Tests (01 – 50)
- Hardware Group Optional Tests (01, 08, 09, 11, 26, 80).

Hardware Group Test Alls and Processor/Storage Tests

Hardware Group Test Alls are invoked by selecting 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 selected with the hardware group number that will cause 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 stops and a status code is displayed. If HG 81, 82, or 87 is 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 stops the test run, the error can be bypassed by use of the *continue* function (key in **1** and press Enter). The *continue* function is available only when running tests in terminal mode. 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 on which hardware groups are installed in the controller under test. The chart below is an example of the order tests would run on a 3174 Models 81R and 91R.

Test All 81	Test All 82 or Alt 2 IML	Test All 87
2X87	2X87	2X87
2X01	2X01	
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 time. It is recommended that this test be performed only at customer setup time because of special requirements for completing the test successfully. The special requirements are as follows:

- All terminal cables must be disconnected from the terminal adapter ports, except for the cable connected to logical port 0.
- 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.

Test All 82 (Alt 2 IML)

Test All 82 is normally used after the controller has been installed and a failure has occurred. The following tests are performed by Test All 82:

- Processor and storage
- Diskette drive
- All adapters.

Test All 82 does not run any wrap tests, so there are no requirements for setting test switches. If Test All 82 runs successfully, 2082 is displayed in the status display.

Test All 87

Test All 87 is normally used after the controller has been installed and a failure occurs. The following tests are performed by Test All 87.

- Processor
- Storage.

Test All 87 does not run any wrap tests, so there is no requirement for setting test switches. If Test All 87 runs successfully, 2087 appears in the status display.

Hardware Group Basic Tests

Hardware Group Basic Tests are invoked by selecting a hardware group number 01 – 50 at the test monitor 4001 prompt message. These tests can be looped by use of an optional test parameter. Hardware Group Basic Tests (01 – 50) 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 only difference is that one specific adapter is being tested. If an error occurs during a hardware group basic test, the test stops and a status code is displayed. Tests can be terminated by use of the *free* function (press Enter, 4001 is displayed, and another test request can be entered).

Hardware Group Optional Tests

Hardware Group Optional Tests are invoked by selecting a hardware group number (01, 08, 09, 11, 26, or 80) and a function number and/or a function parameter. These tests can be looped by selecting an optional test parameter before the function number. Hardware Group Optional Tests provide special test capabilities, such as communication cable wraps and port wraps. Hardware Group Optional Tests can be selected for the following:

- Diskette drive
- Timer
- Operator panel
- Communication adapter
- Terminal Adapter/3299 Multiplexer
- 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 2-1 lists all the test requests that can be selected. The microcode for these tests is on the Utility diskette. Test requests that start with hardware group numbers 01 – 50 can be selected only at the test monitor 4001 prompt message. Test requests that start with hardware group numbers 80, 81, 82, and 87 can be selected at either the Alt 1 IML 40 prompt or the test monitor 4001 prompt. Hardware groups 81, 82, and 87 are normally selected 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 parameters.

The test request format is: HG TP FN FP Where:

HG = Hardware group number (see Table 2-1)
TP = Test parameter (optional) (see Table 2-2 on page 2-39)
FN = Function Number (optional) (see Table 2-1)
FP = Function Parameter (optional) (see Table 2-1).

Table 2-1. Hardware Group and Test Parameters

HG	TP	FN	Description	FP	FP Description
01	90 – 97		Diskette 1		
01	90 – 97	01	Diskette 1 Ready Test		
01	90 – 97	02	Diskette 1 Media Surface Test		
08	90 – 97		Timer		
08	90 – 97	01	Read Timer		
08	90 – 97	02	Set Timer		
09	90 – 97		Operator Panel		
11	90 – 97		Communication Adapter		
11	90 – 97	01	Interface Wrap Test		
11	90 – 97	02	Modem Wrap (external clock)		
11	90 – 97	04	Modem CD/DSR Status (EIA/V.35)		
11	90 – 97	05	X.21 Wrap (external clock)		
11	90 – 97	07	Type 1 Driver Static Test (NTT Japan)		
26	90 – 97		Terminal Adapter		
26	90 – 97	01	Terminal Adapter Port Wrap	00, 08, 16, 24	Terminal Adapter Port Number
26	90 – 97	02	Term Mpx/3299-2, 3 Port Wrap	00 – 31	Logical Port Number
26	90 – 97	03	Terminal Path Test	00 – 31	Logical Port Number
26	90 – 97	04	CUT Display Exerciser	00 – 31	Logical Port Number
26	90 – 97	05	Terminal Adapter Wrap All		
26	90 – 97	06	Terminal Mpx/3299-2, 3 Wrap All	00, 08, 16, 24	Terminal Adapter Port Number
26	90 – 97	07	Printer Exerciser Test	00 – 31	Logical Port Number
80		01	Display Test Log		
80		02	Display Test Log – IML Drive		
80		03	Reset Test Log – IML Drive		
80		04	Display Hardware Configuration		
80		05	Display FRU ID Table		
80		06	Display Test Log Count/Time		
80		07	Display Test Log Count/Time IML Drive		
81	90 – 97		Test All (CSU Mode)		
82	90 – 97		Test All (Installed Mode)		
87	90 – 97		Processor/Storage		

Test Parameters

Test parameters, defined in Table 2-2, are used to qualify a test request.

Table 2-2. 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 reselected 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.

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 will stop and display each error as it occurs. A *continue* function can be used to allow the test request to proceed. The continue function can be used only when running the tests from the terminal connected to port 0. When running HG 81, 82, or 87 with stop on error off, the test control program will collect each error in a log without stopping and present all the errors at the end of the test.

Obtaining the Alt 1 IML 40 Prompt Message

1. Insert the Utility diskette.
2. Press and hold Alt 1; press and release IML.
3. Release Alt 1.
4. 40 is displayed in the Status indicators.

Load the Diagnostic Test Monitor (Terminal Control)

A 3278 or equivalent terminal must be connected to port 0. There are three methods for selecting terminal control.

Method 1

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter, 80 - - is displayed.
4. At 80 - -, press Adv until 94 is displayed.
5. At 94, press Enter, 8094 is displayed.
6. Press Enter.
7. At 4080, go to the terminal connected to port 0.
8. The Diagnostic Test Menu is displayed; see "Terminal Control Test Menus" on page 2-41.
9. 4001 is displayed on the terminal under the Select line.

Method 2

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Enter.
3. At 7000, go to the terminal connected to port 0.
4. The Master menu is displayed.
5. Type in **4**
6. Press ENTER.
7. The Diagnostic Test Menu is displayed; see "Terminal Control Test Menus" on page 2-41.
8. 4001 is displayed on the terminal under the Select line.

Method 3

This method is used only when the 4001 prompt message is displayed on the operator panel.

1. At 4001, press Adv until 80 is displayed.
2. At 80, press Enter; 80 - - is displayed.
3. At 80 - - press Adv until 94 is displayed.
4. Press Enter; 8094 is displayed.
5. At 8094, press Enter.
6. At 4080, go to the terminal connected to port 0.
7. The Diagnostic Test Menu is displayed; see "Terminal Control Test Menus" on page 2-41.
8. 4001 is displayed on the terminal under the Select line.

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 of entering a test request on the test menus.

Method 2

1. Type in the HG number on the Select line of the Diagnostic Test Menu.
2. Press PF8. If no other parameters are required, press Enter.
3. Type in the TP number on the Select line of the Test Parameters Menu.
4. Press PF8. If no other parameters are required, press Enter.
5. Type in the FN number and/or the FP number on the Select line of the Selectable Functions Menu.
6. Press ENTER.

Method 3

1. Type in the entire Test Request on the Select line of the Diagnostic Test Menu.
2. Press ENTER.

If Method 3 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 Diagnostic Test Menu and HG 26 is the hardware group to be tested.

- Diagnostic Test Menu – Displays the hardware groups that are installed (see Figure 2-1).
- Test Parameter Menu – Displays optional test parameters (see Figure 2-2).
- Selectable Functions Menu – Displays function numbers and function parameters (see Figure 2-3).

Depending on the hardware group that was selected from the first menu, different function numbers and function parameters are displayed on the third 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 - 1.2 MB              09       Operator Panel
   08       Timer                            26       Terminal Adapter
                                             80       Test Monitor Functions
                                             81       Test All-Setup Mode
                                             82       Test All-Installed Mode


SELECT ===>
4001

PF: 3=3174 Menu     8=Fwd
```

Figure 2-1. 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 2-2. Test Parameters Menu

```
                          _____Selectable Functions_____

FN  Description                              FP  Description

01  Terminal Adapter Port Wrap               PT  Terminal Adpt Port 00
02  3299-2, 3 Port Wrap                      PT  Logical Port 00-07
03  Terminal Path Test                       PT  Logical Port 00-07
04  CUT Display Exerciser                    PT  Logical Port 00-07
05  Terminal Adapter Wrap All                NR  Not Required
06  3299-2, 3 Wrap All                       PT  Base Port 00
07  Printer Exerciser                        PT  Logical Port 00-07


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 2-3. Selectable Functions Menu

How to Run Hardware Group Test Alls HG 81 and 82

1. Load the Diagnostic Test Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Type in **81** or **82** and press ENTER.
3. The following codes are displayed under the select line on the terminal, where HG = the hardware group being tested:.

   21HG
   22HG
   29HG
   20HG.

   For all other status codes, see the *3174 Status Codes* manual.
4. To make another selection, at 29HG or 20HG press ENTER.

How to Run Hardware Group Basic Tests (HG 01 – 50)

1. Load the Diagnostic Test Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Type in the desired HG number. See Table 2-3 on page 2-44.
3. If required, key in a TP number. See Table 2-4 on page 2-44.
4. Press ENTER.

   The following codes are displayed under the select line on the terminal, where HG = the hardware group being tested.

   21HG
   22HG
   20HG
   29HG.

For all other status codes, see the *3174 Status Codes* manual.

Note: To bypass error stops (29HG) for HG 81, 82, and 87, key in **1** and press ENTER (continue function) to continue the test.

To make another selection at 29HG or 20HG, press ENTER to display the 4001 prompt.

These examples assume that you have the 4001 prompt on the terminal connected to port 0 and the test is being run from that terminal. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
To run a Terminal Adapter Test:

1. Type in **26** and press ENTER.

To loop a Terminal Adapter Test:

1. Type in **4** and press ENTER. The diagnostic test menu is displayed.
2. Type in **2691** and press ENTER.

To run CSU tests:

1. Type in **4** and press ENTER. The diagnostic test menu is displayed.
2. Type in **81** 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. They must be run from the Diagnostic Test Menu as shown in the example.

Table 2-3. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	80	Test Monitor Functions
01	Diskette/File Adapter	81	Test All Setup Mode
08	Timer	82	Test All Installed Mode
09	Operator Panel	84	Reserved
11	Communication Adapter	87	Processor/Storage
26	Terminal Adapter	99	Unknown or unassigned

Table 2-4. 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 causes any valid hardware group test to repeat until it is terminated by user intervention or by an error. 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 monitor error log. When the 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 monitor 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.

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 will stop and display each error as it occurs. When running HG 81, 82, or 87 with stop on error off, the test control program will collect each error in a log without stopping and present all the errors at the end of the test.

How to Read and Set the Timer (HG 08)

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 timer 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.

Read the Timer (FN 01)

1. Load the Diagnostic Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Type in **0801**
3. Press ENTER.
4. The day and time are displayed under the select line in the format DAYHRMN.

   DAY = 0000 to 0255
   HR = 00 to 23 minutes
   MN = 00 to 59 seconds
5. To make another selection, press ENTER. 4001 is displayed.
6. If any other status code is displayed, see the *3174 Status Codes* manual.

Set the Timer (FN 02)

1. Load the Diagnostic Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Type in **0802**
3. Press ENTER. 4542 is displayed under the select line.
4. Type in the day—any value from 0000 to 0255— and type in the time—any value from 0000 to 2359.
5. Press ENTER. 2008 is displayed.
6. To make another selection, press ENTER; 4001 is displayed.
7. If any other status code is displayed, see the *3174 Status Codes* manual.

How to Run Communication Adapter Optional Tests HG 11

1. Load the Diagnostic Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Type in **11** and press PF8. The test parameter menu is displayed.
3. Type in a Test Parameter and press PF8. The selectable functions menu is displayed.
4. Before selecting a function number, determine if the controller has a Type 1 or Type 2 communication adapter.

   Models 81R and 91R use a Type 1 Communication Adapter.
   Models 82R and 92R use a Type 2 Communication Adapter.

   Note: Table 2-5 and the paragraphs following "Communication Adapter Function Number Descriptions" describe the purpose of each function number and any conditions that have to be met before a particular function number can be used.
5. Type in a function number.
6. Press ENTER. The test begins.
7. The following status codes are displayed under the select line on the terminal:

   2111 = Test in progress

   2211 = Test in progress

   2011 = Test completed

   3030 = Test failed.

   For all other status codes, see the *3174 Status Codes* manual.
8. To make another selection or to terminate the test, press ENTER.

Table 2-5. Function Numbers (Communication)

FN	Description	Condition
01	Interface Wrap Test	• For EIA/V.35: Set the cable Test/Oper switch to Test or use wrap plug (P/N 6423419). • For X.21: Set the cable Test/Oper switch to Test or use a wrap plug (P/N 6423420).
02	Modem Wrap	Set the interface cable Test/Oper switch to Oper.
04	Type 1 Interface Status Test	Set the cable Test/Oper switch to Oper.
05	Type 2 Interface Clock Test	Set the cable Test/Oper switch to Test.
07	Type 1 Driver Static Test	None.

In the test descriptions that follow, see Figures 2-5 through 2-7 for communication line flow.

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 and Type 2 communication adapter. With the external interface cable connected, the data is wrapped through the Test/Oper switch(es) 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): Disconnect the external interface cable from the modem. Connect the external interface cable to the 3174 and set the Test/Oper switch(es) to Test, or install a wrap plug (P/N 6423419) on the communication adapter port.

For Type 2 Communication Adapter (X.21): Disconnect the external interface cable from the modem. Connect the external interface cable to the 3174 and set the Test/Oper switch to Test, or install a wrap plug (P/N 6423420) on the communication adapter port.

Notes:

1. Function number 01 runs automatically when customer setup tests (HG 81) are performed.
2. For X.21 the wrap test does not fail if only one of the Signal A or Signal B lines is broken.

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.
- The external interface cable must be connected to the communication adapter and to the modem.
- The Test/Oper switch on the cable must be 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 does 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 Oper.

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 test FN 01 is used in conjunction with the Test/Oper switch. See Figures 2-6 and 2-4 for the switch settings of the Test/Oper switches before starting the wrap test. If any other switch setting is used, the wrap test fails.

Table 2-6. 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

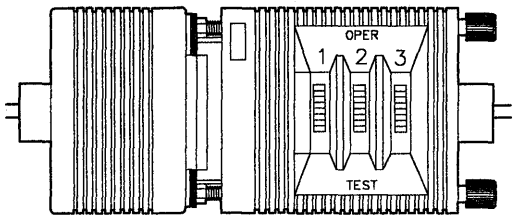
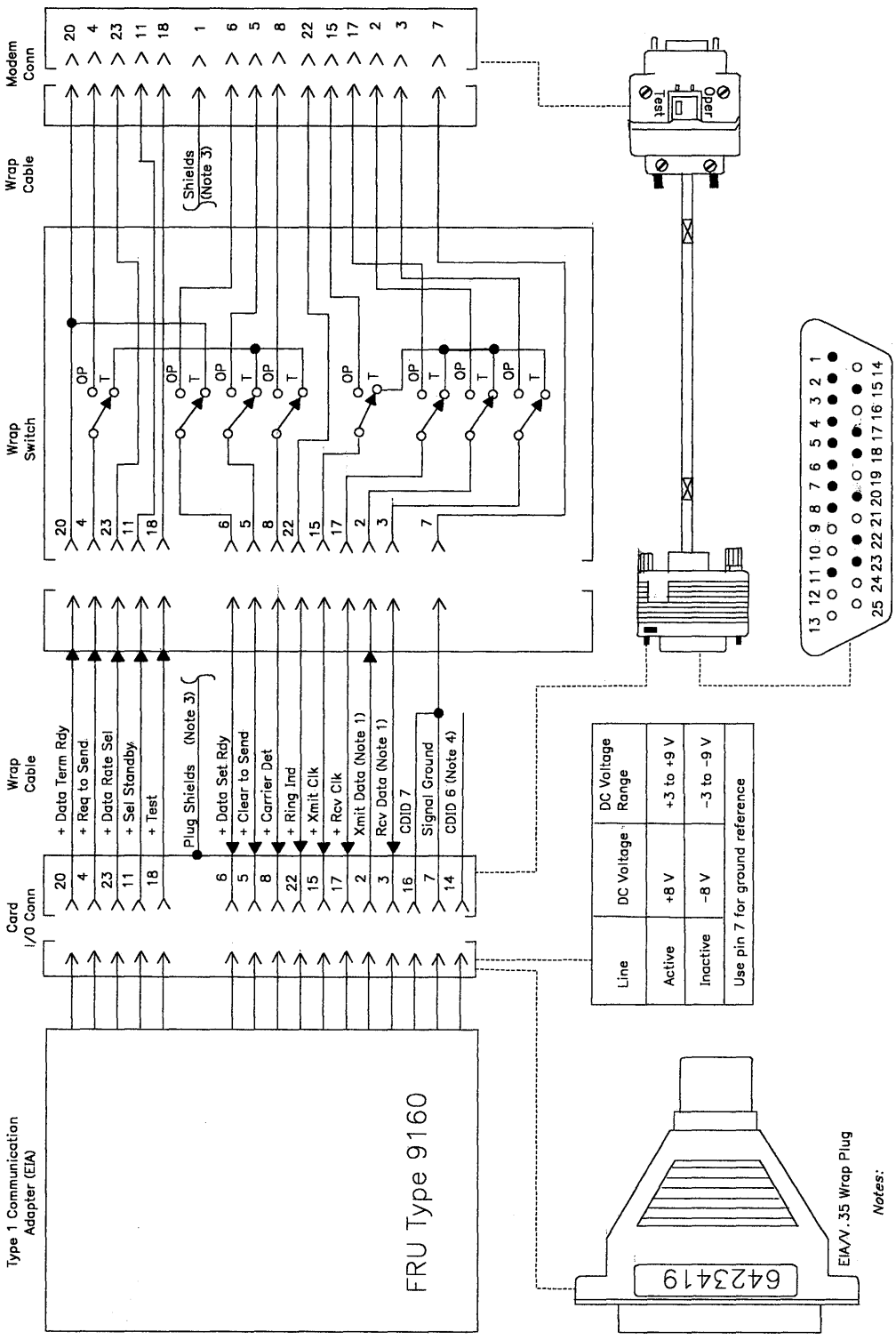


Figure 2-4. V.35 Three-Switch Test/Oper Switch



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.*

Figure 2-5. EIA Communication Line Flow (Cable and Wrap Plug)

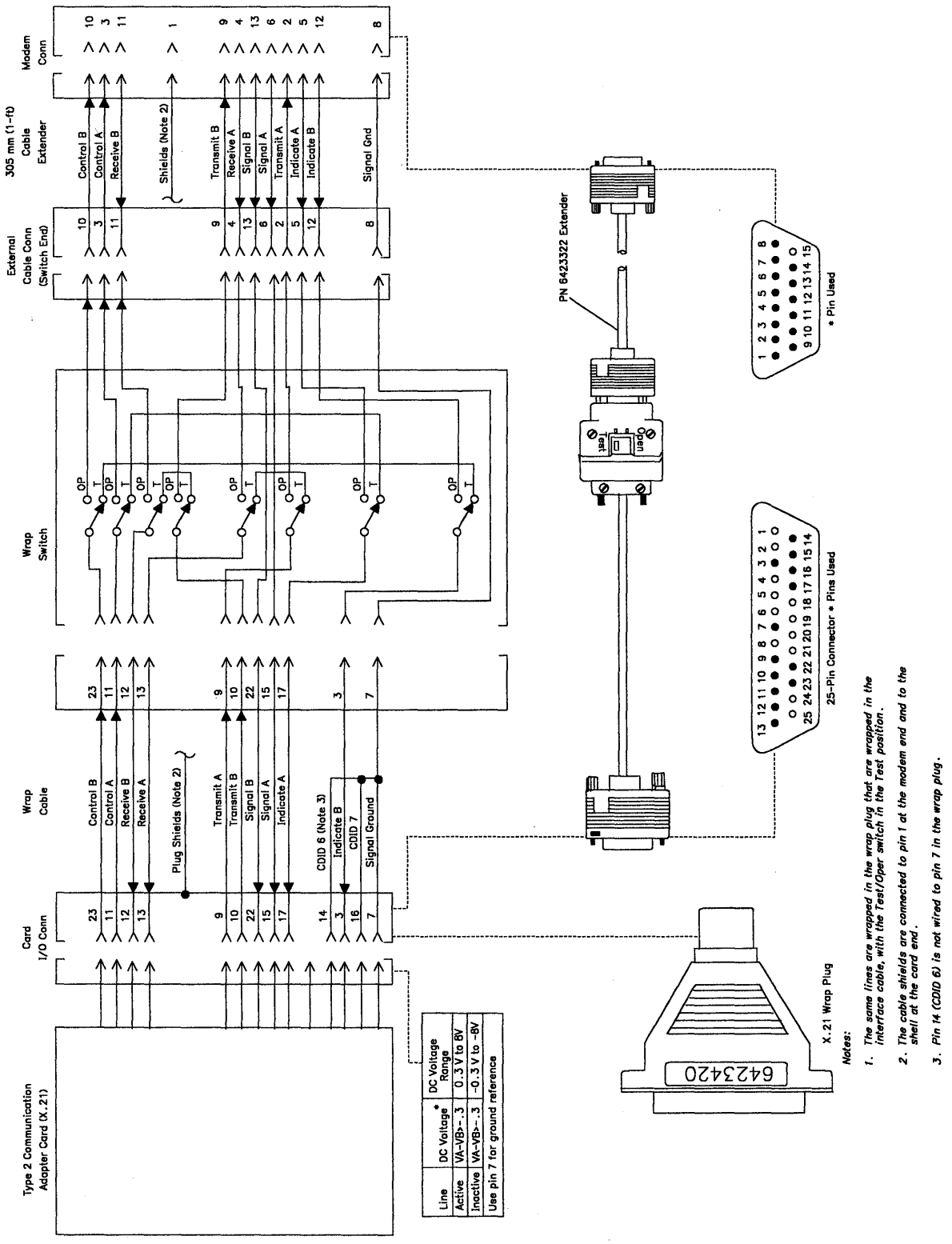


Figure 2-6. X.21 Communication Line Flow, Switched and Nonswitched (Cable and Wrap Plug)

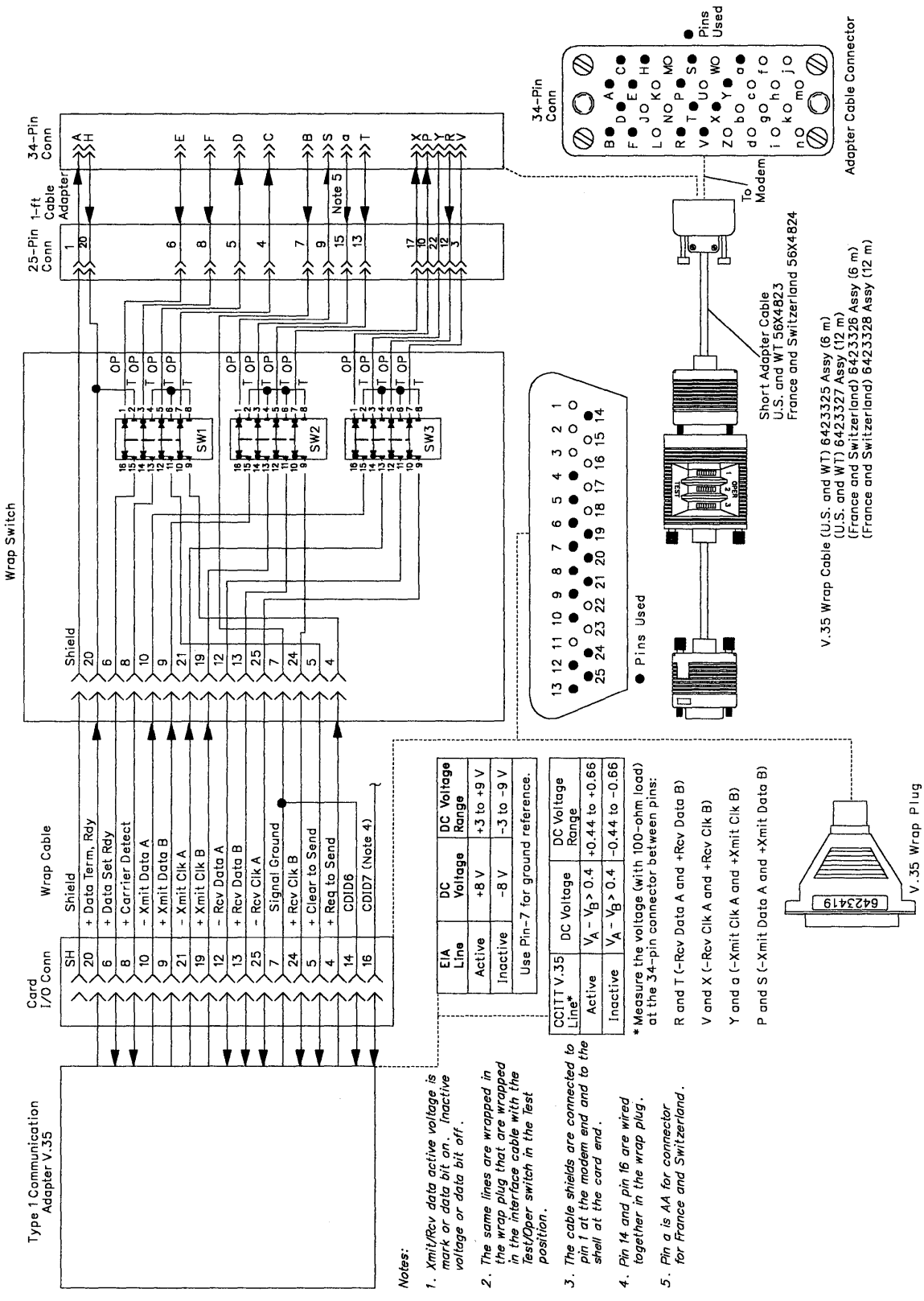


Figure 2-7. V.35 Communication Line Flow (Cable and Wrap Plug)

How to Run Terminal Adapter/3299 Optional Tests HG 26

1. Load the Diagnostic Monitor. See "Load the Diagnostic Test Monitor (Terminal Control)" on page 2-40.
2. Key in **26** and press PF8. The test parameter menu is displayed.
3. Key in a test parameter, press PF8. The selectable functions menu is displayed.
4. Select a function number and function parameter.

   Note: Table 2-7 and the paragraphs following Table 2-7 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.
5. Key in a function number and a function parameter.
6. Press Enter. The test begins.
7. The following status codes are displayed under the select line on the terminal:

   2126 = Test in progress
   2226 = Test in progress
   2026 = Test completed
   3040 = Test failed
   3041 = Test failed
   3042 = Test failed
   4550 = Test completed.

   For all other status codes, see the *3174 Status Codes* manual.
8. 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 2-7. Function Numbers and Function Parameters (Port Wrap)

FN	Description	FP	Description	Condition
01	Terminal Adapter Port Wrap	00 – 03	Terminal Adapter Port 00 – 03	Disconnect the port signal cable.
02	3299-2, 3299-3 Port Wrap	00 – 07	Logical Port 00 – 07	Disconnect the 3299 output port signal cable.
03	Terminal Path Test	00 – 07	Logical Port 00 – 07	Terminal attached and powered on.
04	CUT Display Exerciser	00 – 07	Logical Port 00 – 07	Terminal attached and powered on.
05	Terminal Adapter Wrap All			Disconnect port 00 – 03 signal cables.
06	3299-2, 3299-3 Wrap All	00	Terminal Adapter Port Number	Disconnect the output signal cables from the 3299.
07	Printer Exerciser Test	00 – 07	Logical Port 00 – 07	Printer attached, powered on and ready.

Terminal Adapter Function Number Descriptions

The following paragraphs describe the port wrap function numbers. Figure 2-8 on page 2-54 shows the terminal attachment.

Terminal Adapter Port Wrap (FN 01): This function number provides an internal wrap test on the individual ports on the terminal adapter. 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.

3299 Model 2,3 Port Wrap (FN 02): This function number provides an internal wrap of the individual output ports on 3299 Terminal Multiplexer Models 2 and 3. The function parameter is used to specify the logical port number to be wrapped. 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 terminals that are directly attached to the terminal adapter or attached through a 3299 Model 1, 2 or 3. The function parameter is used to specify the logical port number of the terminal to be tested. The path is automatically determined by the diagnostic. 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 3299 Model 1, 2 or 3. 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. Status code 4050 indicates successful test completion. Status codes 3041 and 3042 indicate the test failed.

Terminal Adapter Wrap All (FN 05): This function number provides an internal wrap test of the nine ports on the terminal adapter. A function parameter is not required for this function number. Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

3299 Model 2,3 Wrap All (FN 06): This function number provides an internal wrap of the eight output ports on a 3299 Model 2 or 3. The function parameter is used to specify the port number on the terminal adapter that the 3299 is attached to.

Note: Wrap tests FN 02 and 06 cannot be performed on 3299 Terminal Multiplexer Model 1.

Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

Note: Function numbers 05 and 06 run on the terminal adapter logic 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 3299 Model 1, 2 or 3. 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. This test is restricted to 3262, 3268, 3287, 3289, 4214, 4224, 4234, 4245, 5210, or equivalent printers. Status code 4550 indicates successful test completion. Status codes 3041 and 3042 indicate the test failed.

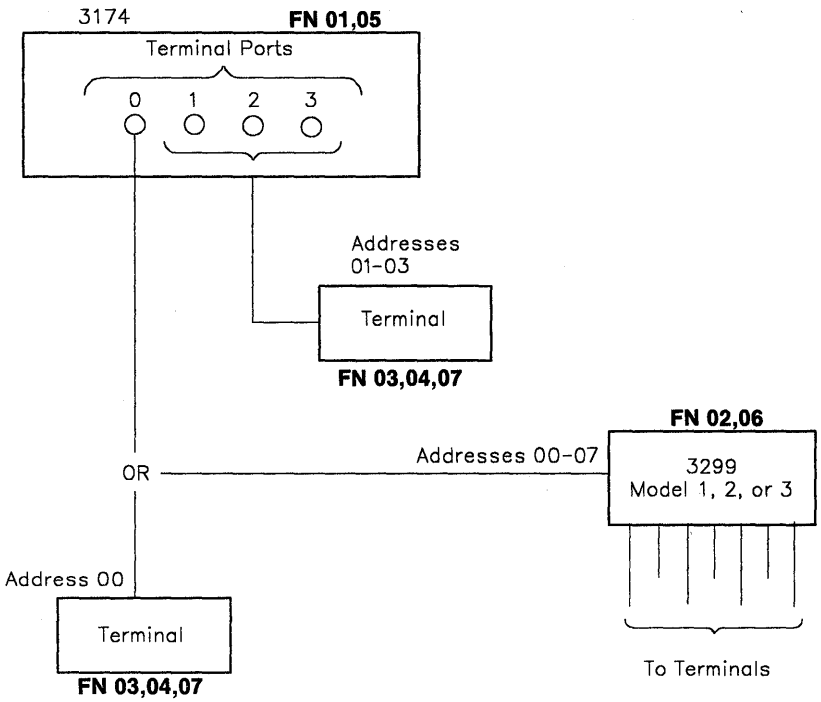


Figure 2-8. Block Diagram of Terminal Attachment

How to Display the Test Log (HG 80)

This test is used to display the test log that is created when errors occur during hardware group tests. The test log can be displayed only 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. At 4001, press Adv until 80 is displayed.
2. Press Enter; 80 - - is displayed.
3. Press Adv until 94 is displayed.
4. Press Enter; 8094 is displayed.
5. Select a function number.

   Note: Table 2-8 and the paragraphs following "Test Log Function Number Descriptions" describe the purpose of each function number.
6. Press Adv until the selected function number is displayed.
7. Press Enter; FN - - is displayed.
8. Press Enter.
9. Go to the terminal connected to port 0.
10. To make another selection at 20HG, press Enter.

Table 2-8. 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.

Display Test Log (FN 01): When function number 01 is selected in terminal control mode the test log (shown in Figure 2-9 on page 2-56) 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 does not display.

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 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 displays only the status codes 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 9113 02   9160 03

 2      00:02:35      3024 0102 9113 02   9160 03

 3      00:05:03      3024 0102 9113 02   9160 03

 4      01:20:06      2987 9160 05

 5      01:22:36      2987 9160 05


 PF: 3=Quit 8=Fwd
```

Figure 2-9. Test Log

Note: The start time and elapsed time are in hours, minutes, and seconds. The elapsed time is the amount of time that passed while the test was running until a failure occurred.

How to Display the Test Monitor Functions (HG 80)

1. Insert a Utility diskette.
2. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
3. At 40, press Enter.
4. At 7000, go to the terminal connected to port 0. The master menu is displayed.
5. Key in **4**, then press Enter. The diagnostic test menu is displayed and 4001 is displayed under the select line.
6. Select a function number.

   Note: Table 2-9 and the paragraphs following "Test Monitor Function Number Descriptions" on page 2-57 describe the purpose of each function number.
7. At 4001, key in **80FN**

   Where:

   80 = Load Test Monitor
   FN = Function number
8. Press Enter.
9. To make another selection at 2080, press Enter.

Table 2-9. 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.

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 displays the Test Log (shown in Figure 2-9 on page 2-56) 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 used only when the test log is not available. See "How to Display the Test Log (HG 80)" on page 2-55.

Note: If the test log on the IML drive 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 displays the Hardware Configuration Table shown in Figure 2-10 on page 2-58 and must be selected when the diagnostics are controlled from the terminal. This table 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 displays 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.

```
                  _____ Hardware Configuration Table _____


 HG TYPE LC DESCRIPTION            SC    HG TYPE LC DESCRIPTION          SC
 00 9001 00 Invalid Card/Cond            09 9523 07 Ops Panel Assembly
 01 9113 01 Diskette 1 - 2.4MB   32XX    11 9160 03 Type 1 Com Adpt-XXX
 01 9160 03 File Adpt                    87 9160 03 Processor
 08 9160 03 Timer                        87 9160 03 Storage 1MB
 09 9160 03 Ops Panel Adpt




Select Test; press ENTER ====>_

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

Figure 2-10. Hardware Configuration Table (Offline Test Monitor)

HG = Hardware group
TYPE = FRU Type number
LC = Location
SC = Status code

Note: This table shows the configuration for a 3174 Model 81R. The FRU type numbers may vary for different models of the 3174. Only those FRUs that are physically installed are displayed in this table. All the adapters that are listed with the same FRU type 9160 are contained on the planar board.

For the communication adapter, the XXX equals 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.

WRP = X.21 wrap plug is connected.

INV = An undefined cable or wrap plug is connected.

Operator Panel Offline Test Selection Overview

Selection of offline tests from the operator panel is from menu lists. Menu lists are provided for the Alt 1 IML 40 prompt, test parameters, hardware groups, hardware group function numbers, and hardware group function parameters.

Operator Panel Usage General Rules

The general rules for offline test selection from the operator panel at the Alt 1 IML 40 prompt or the test monitor 4001 prompt are as follows:

1. Pressing Adv causes a menu list to be started or advanced.
2. Pressing Enter causes a displayed menu list item to be selected. Pressing the Enter key a second time causes the test or function to execute.
3. At the end of each menu list, four blanks are displayed in the status indicators. Pressing Enter when the blanks are displayed returns the display to the 40 or 4001 prompt.

Alt 1 IML Menu List (40 prompt)

The menu list shown in Figure 2-11 can be stepped through and selected after an Alt 1 IML is performed. Note that number 41 in the menu requires the control diskette, and numbers 82 and 87 can be selected with either the Control or the Utility diskette.

```
* * 40   Alt 1 IML 40 prompt
41 * *   Normal IML (Control Diskette)
42 * *   Reserved
43 * *   Reserved
44 * *   Reserved
45 * *   Reserved
80 * *   Test Monitor (Utility diskette)
81 * *   Test All CSU Mode (Utility Diskette)
82 * *   Test All Installed Mode (Utility or Control diskette) (See Note)
84 * *   Reserved
87 * *   Processor/Storage (Utility or Control diskette)
* * * *  Four Blanks (End of Menu list)
```

Notes:

1. An asterisk (*) denotes a blank position in the Status display.
2. If 82 is selected with the Control diskette installed, only the processor and storage logic are tested. For a full diagnostic run, the Utility diskette is required.

Figure 2-11. Alt 1 IML Menu List

Test Monitor Menu List (4001 Prompt)

Figure 2-12 shows the hardware group menu list that can be stepped through and selected at the test monitor 4001 prompt.

```
4001      Test Monitor Prompt
01 * *    Diskette Drive
08 * *    Timer
09 * *    Operator Panel
11 * *    Communication Adapter
26 * *    Terminal Adapter
80 * *    Test Monitor
81 * *    Test All (CSU Mode)
82 * *    Test All (Installed Mode)
84 * *    Reserved
87 * *    Processor/Storage
* * * *   Four Blanks (End of Menu list)
```

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-12. Test Monitor Menu List

Hardware Group FN, TP, and FP Menu Lists

Figure 2-13 through Figure 2-19 show the function numbers, test parameters, and function parameters that can be stepped through and selected after a hardware group is selected. Only hardware group 26 has function parameters.

Hardware Group 01

```
01 * *   Diskette Ready Test
02 * *   Diskette Media Surface Test
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
* * * *  Four Blanks (End of Menu list)
```

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-13. Hardware Group 01 FN and TP Menu List

Hardware Group 08

```
01 * *   Read Time of Day
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
* * * *  Four Blanks (End of Menu list)
```

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-14. Hardware Group 08 FN and TP Menu List

Hardware Group 09

Hardware Group 09 has no assigned function numbers.

```
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
* * * *  Four Blanks (End of Menu list)
```

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-15. Hardware Group 09 TP Menu List

Hardware Group 11

```
01 * *  Interface Wrap Test
02 * *  Modem Wrap (External Clock)
03 * *  Reserved
04 * *  Modem CD and DSR Status (EIA/V.35)
05 * *  X.21 Wrap External Clock
07 * *  Type 1 Driver Static Test (NTT Japan)
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
* * * *  Four Blanks (End of Menu list)
```

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-16. Hardware Group 11 FN and TP Menu List

Hardware Group 26

01 * * Terminal Adapter Port Wrap
02 * * 3299-2 or 3 Port Wrap
03 * * Terminal Path Test
04 * * CUT Display Exerciser
05 * * Terminal Adapter Wrap All
06 * * 3299-2 or 3 Wrap All
07 * * Printer Exerciser Test
20 * * Reserved
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
* * * * Four Blanks (End of Menu list)

Note: An asterisk (*) denotes a blank position in the Status display.

FN	FP Available							
	00	01	02	03	04	05	06	07
01	X	X	X	X				
02	X	X	X	X	X	X	X	X
03	X	X	X	X	X	X	X	X
04	X	X	X	X	X	X	X	X
05								
06	X							
07	X	X	X	X	X	X	X	X

Note: For function number 01 port numbers 00 – 03 are the terminal adapter port numbers.
For FNs 02, 03, 04, and 07 FP numbers 00 – 03 are the terminal adapter or 3299 port numbers, and FP numbers 04 – 07 are 3299 port numbers.
For FN 05 test parameter 00 is the terminal adapter port number.

Figure 2-17. Hardware Group 26 FN, TP, and FP Menu Lists

Hardware Group 80

01 * * Display Test Log
02 * * Display Test Log - IML Drive
03 * * Reset Test Log - IML Drive
06 * * Display Test Log Count/Time
07 * * Display Test Log Count/Time IML Drive
* * * * Four Blanks (End of Menu list)

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-18. Hardware Group 80 FN Menu List

Hardware Groups 81, 82, and 87

01 * * Reserved (HG 87 only)
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
* * * * Four Blanks (End of Menu list)

Note: An asterisk (*) denotes a blank position in the Status display.

Figure 2-19. Hardware Group 81, 82, and 87 TP Menu List

Operator Panel Test Selection Example

The following example is provided to show how the menu lists are used to select and execute an offline test. This example uses hardware group 26 (terminal adapter), test parameter 92, function number 01 (terminal adapter port wrap), and function parameter 02 (terminal adapter port number 02). This example is presented in text and then it is repeated graphically in Figure 2-20 on page 2-66.

Terminal Adapter Port Wrap Example

1. Insert the Utility diskette into the diskette drive.
2. Press and hold Alt 1, then press and release IML.
3. 31 is displayed.
4. At 31, release Alt 1; 40 is displayed.
5. At 40, press Adv until 80 is displayed.
6. At 80, press Enter; 80 - - is displayed.
7. At 80 - -, press Enter; 4001 is displayed.
8. At 4001, press Adv until 26 is displayed.
9. At 26, press Enter; 26 - - is displayed.
10. At 26 - -, press Adv until 92 is displayed.
11. At 92, press Enter; 2692 is displayed.
12. At 2692, press Adv until 01 is displayed.
13. At 01, press Enter; 01 - - is displayed.
14. At 01 - -, press Adv until 02 is displayed.
15. At 02, press Enter; 0102 is displayed.
16. At 0102, press Enter to start test execution.

1. Perform an ALT 1 IML

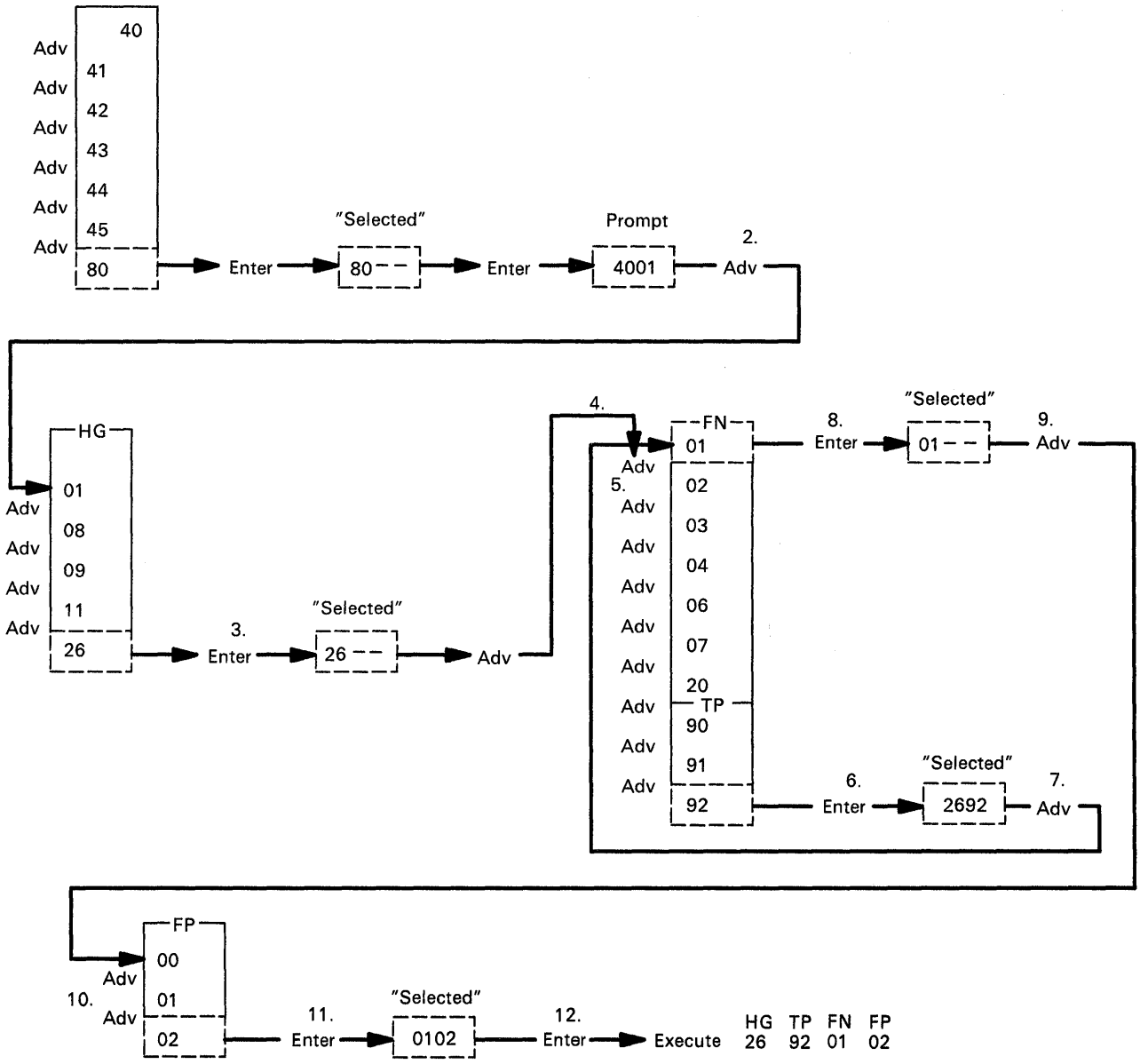


Figure 2-20. Operator Panel Test Selection Example (HG26)

Selection of Offline Test Operator Panel Control (4001 Prompt)

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter; 80 - - is displayed.
4. At 80 - -, press Enter.
5. 4001 is displayed on the operator panel.

How to Run Hardware Group Test Alls or Processor/Storage

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40; press Adv until 81, 82, or 87 is displayed where:

   81 = Test All (CSU Mode)

   82 = Test All (Installed Mode)

   87 = Processor/Storage.
3. Press Enter; 8x - - is displayed.
4. Press Enter; test execution begins.

   The status indicators display one of the following codes,
   Where: HG = 81, 82, or 87.

   - 21HG
   - 22HG
   - 20HG
   - 29HG
   - For all other status codes see the *3174 Status Codes* manual.
5. To make another selection, at 20HG or 29HG press Enter. The 4001 prompt is displayed.

How to Run Hardware Group Basic Tests (HG 01 – 50)

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter, 80 - - is displayed.
4. At 80 - -, press Enter.
5. At 4001, press Adv until the desired HG number is displayed. See Table 2-10 on page 2-69.
6. Press Enter, HG - - is displayed.
7. At HG - -, press Enter to run the test or press Advance to select a test parameter
8. At TP, press Enter; HGTP is displayed. See Table 2-10 on page 2-69.
9. At HGTP, press Enter.

The status indicators display one of the following codes, where

HG = The hardware group being tested:

21HG = Test in progress

22HG = Test in progress

20HG = Test complete

29HG = Test failure.

For all other status codes, see the *3174 Status Codes* manual.

Note: To bypass error stops, (29XX) for HG 81, 82, and 87, press Enter (*Free* function) to display 4001.

To make another selection at 20XX, press Enter. The 4001 prompt is displayed.

These examples assume the Alt 1 IML function has been performed.

To run a Terminal Adapter Test:

1. At 40, press Adv until 80 is displayed.
2. At 80, press Enter.
3. At 80 - -, press Enter.
4. At 4001, press Adv until 26 is displayed.
5. At 26, press Enter.
6. At 26 - -, press Enter.

To loop a Terminal Adapter Test:

1. At 40, press Adv until 80 is displayed.
2. At 80, press Enter.
3. At 80 - -, press Enter.
4. At 4001, press Adv until 26 is displayed.
5. At 26, press Enter.
6. At 26 - -, press Adv until 91 is displayed.
7. At 91, press Enter.
8. At 2691, press Enter.

To run CSU tests:

1. At 40, press Adv until 81 is displayed.
2. At 81, press Enter.
3. At 81 - -, press Enter.

To run CSU Tests/Terminal Control:

1. At 40, press Adv until 81 is displayed.
2. At 81, press Enter.
3. At 81 - -, press Adv until 94 is displayed.
4. At 94, press Enter.
5. At 8194, press Enter.
6. Go to the terminal connected to port 0.

Note: Only HGs 81, 82, and 87 can be selected at the 40 stop. For all others, an **80** must be entered first, as shown in the examples.

Table 2-10. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	80	Test Monitor Functions
01	Diskette/File Adapter	81	Test All Setup Mode
08	Timer	82	Test All Installed Mode
09	Operator Panel	84	Reserved
11	Communication Adapter	87	Processor/Storage
26	Terminal Adapter	99	Unknown or unassigned

Table 2-11. 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 causes any valid hardware group test to repeat until it is terminated by user intervention or by an error. 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 monitor error log. When the 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 monitor 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.

Stop on Error

Stop on error is applicable when HG81, 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 will stop and display each error as it occurs. When running HG 81, 82, or 87 with stop on error off, the test control program will collect each error in a log without stopping, and present all the errors at the end of the test.

How to Run Diskette Drive Optional Tests (HG 01)

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 test. This test is used to check for defective tracks and sectors on a diskette.

Diskette Drive Ready Test (FN 01)

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter; 80 - - is displayed.
4. At 80 - -, press Enter.
5. At 4001, press Adv; 01 is displayed.
6. At 01, press Enter; 01 - - is displayed.
7. At 01 - -, press Adv; 01 is displayed.
8. At 01, press Enter; 0101 is displayed.
9. At 0101, press Enter.
10. 4561 or 4563 is displayed.
11. Open the diskette drive door; 4560 is displayed.
12. Close the diskette drive door; 4561 is displayed.
13. Open the diskette drive door and remove the diskette; 4562 is displayed.
14. Insert the diskette and close the diskette drive door; 4563 is displayed.
15. Repeat steps 12 through 14 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 planar board is defective.

16. To make another selection press Enter. The 4001 prompt is displayed.

If any other status code is displayed, see the *3174 Status Codes* manual.

Diskette Drive Media Surface Test (FN 02)

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter; 80 - - is displayed.
4. At 80 - -, press Enter.
5. At 4001, press Adv; 01 is displayed.
6. At 01, press Enter; 01 - - is displayed.
7. At 01 - -, press Adv until 02 is displayed.
8. At 02, press Enter; 0102 is displayed.
9. At 0102, press Enter; 4565 is displayed.
10. Insert the diskette to be scanned. If the Utility diskette is being scanned, skip this step and continue with step 12.
11. At 4565, press Adv; 01 is displayed.
12. Press Enter.
13. The Status indicators display one of the following codes:

    2101 = Test in progress
    2201 = Test in progress
    4566 = Test completed (no defects found)
    4567 = Test completed (defects found).

14. If 4567 is displayed, record the additional data. See status code 4567 in the *3174 Status Codes* manual.
15. To make another selection at 4566 or 4567, press Enter. The 4001 prompt is displayed.

How to Read the Day and Time of Day (HG 08)

This test provides the capability of reading the time-of-day and day counter. The time of day 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 time-of-day 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.

Note: The time-of-day and day counters are reset to zeros when the controller is powered off and on.

Read the Time of Day (FN 01)

1. Insert a Utility diskette.
2. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
3. At 40, press Adv until 80 is displayed.
4. At 80, press Enter; 80 - - is displayed.
5. At 80 - -, press Enter.
6. At 4001, press Adv twice; 08 is displayed.
7. At 08, press Enter; 08 - - is displayed.
8. At 08 - -, press Adv; 01 is displayed.
9. At 01, press Enter; 0801 is displayed.
10. At 0801, press Enter.
11. The day counter is displayed.
12. Press Adv, the time-of-day is displayed.
13. To make another selection, press Enter. The 4001 prompt is displayed.
14. If any other status code is displayed, see the *3174 Status Codes* manual.

How to Run the Operator Panel Test (HG 09)

If the results of this test are not as expected, go to MAP 0110.

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter; 80 - - is displayed.
4. At 80 - -, press Enter.
5. At 4001, press Adv until 09 is displayed.
6. At 09 press Enter; 09 - - is displayed.
7. At 09 - -, press Enter.
8. At 4506, press Adv to step through the following list of characters.

```
0 0 0 0
1 1 1 1
2 2 2 2
3 3 3 3
4 4 4 4
5 5 5 5
6 6 6 6
7 7 7 7
8 8 8 8
9 9 9 9
- - - -
E E E E
H H H H
L L L L
P P P P
Blank Status Indicators
```

Note: Each time the Adv pushbutton is pressed the following should occur on the operator panel:

1. The data transfer indicator comes on for about 1 second.
2. The correct 4 characters display in the status indicators.
3. After about 10 seconds the Check Cond indicator comes on and stays on until Adv is pressed again.
4. Press Enter.
5. If 2009 is displayed, press Enter. The 4001 prompt is displayed.
6. If any other status code is displayed, see the *3174 Status Codes* manual.

How to Run Communication Adapter Optional Tests (HG 11)

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter, 80 - - is displayed.
4. At 80, press Enter.
5. At 4001, press Adv until 11 is displayed.
6. At 11, press Enter, 11 - - is displayed.
7. Before selecting a function number determine if the controller has a Type 1 or Type 2 communication adapter.

   Models 81R and 91R use a Type 1 communication adapter (EIA/V.35).
   Models 82R and 92R use a Type 2 communication adapter (X.21).

   Note: Table 2-12 and the paragraphs following "Communication Adapter Function Number Descriptions" on page 2-76 describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.
8. At 11 - -, press Adv until the desired FN number is displayed.
9. At FN, press Enter; 11FN is displayed.
10. At 11FN, press Enter; the test begins.
11. The following status codes display in the status indicators:

    2111 = Test in progress
    2211 = Test in progress
    2011 = Test completed
    3030. = Test failed.

    For all other status codes, see the *3174 Status Codes* manual.
12. To make another selection or to terminate the test, press Enter.

Table 2-12. Function Numbers (Communication)

FN	Description	Condition
01	Interface Wrap Test	• For EIA/V.35: Set the cable Test/Oper switch to Test or use wrap plug part 6423419. • For X.21: Set the cable Test/Oper switch to Test or use wrap plug part 6423420.
02	Modem Wrap	Set the interface cable Test/Oper switch to Oper.
03	Reserved	
04	Type 1 Interface Status Test	Set the cable Test/Oper switch to Oper.
05	Type 2 Interface Clock Test	Set the cable Test/Oper switch to Test.
07	Type 1 Driver Static Test	None.

In the test descriptions that follow, see Figures 2-5 through 2-7 for communication line flow.

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 and Type 2 communication adapter. With the external interface cable connected, 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 and set the Test/Oper switch to Test, or install a wrap plug (P/N 6423419) on the communication adapter port.

For Type 2 Communication Adapter (X.21): Connect the external interface cable and set the Test/Oper switch to Test, or install a wrap plug (P/N 6423420) on the communication adapter port.

Notes:

1. Function number 01 runs automatically when customer setup tests (HG 81) are performed.
2. For X.21 this wrap test does not fail if only one of the Signal A or Signal B lines is broken.

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.
- The external interface cable must be connected to the communication adapter and to the modem.
- The Test/Oper switch on the cable must be 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 4510–4513 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 does not stop until Enter 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 Oper.

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 Enter 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 test FN 01 is used in conjunction with the Test/Oper switch. See Figures 2-13 and 2-21 for the switch settings of the Test/Oper switches before starting the wrap test. If any other switch setting is used, the wrap test fails.

Table 2-13. 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

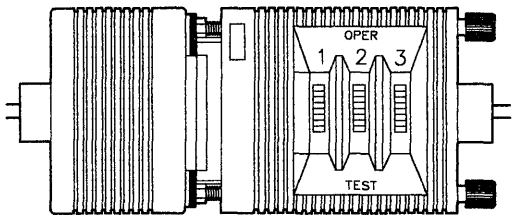


Figure 2-21. V.35 Three-Switch Test/Oper Switch

V.35 Cable Wrap Test (One Test/Oper Switch)

On early-production 3174 Establishment Controllers, the V.35 communication interface cable has a one-switch 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 test FN 01 to test the early-production V.35 interface cables.

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.

How to Run Terminal Adapter/3299 Optional Tests HG 26

1. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
2. At 40, press Adv until 80 is displayed.
3. At 80, press Enter; 80 - - is displayed.
4. At 80 - -, press Enter.
5. At 4001, press Adv until 26 is displayed.
6. At 26, press Enter; 26 - - is displayed.
7. Select a function number/function parameter.

   Note: Table 2-14 on page 2-79 and the paragraphs following Table 2-14 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.

8. At 26 - -, press Adv until the desired FN number is displayed.
9. At FN, press Enter; 26FN is displayed.
10. At 26FN, press Adv until the desired FP number is displayed.

    Note: If a function parameter is not required, go to step 13.

11. At FP press Enter, FP - - is displayed.
12. Press Enter.
13. The following status codes display on the operator panel.

    2126 = Test in progress
    2226 = Test in progress
    2026 = Test completed
    3040 = Test failed
    3041 = Test failed
    3045 = Test failed
    4550 = Test completed.
    For all other status codes, see the *3174 Status Codes* manual.

14. To terminate the test or to make another selection, press Enter.

Table 2-14. Function Numbers and Function Parameters (Port Wrap)

FN	Description	FP	Description	Condition
01	Terminal Adapter Port Wrap	00 – 03	Terminal Adapter Port 00 – 03	Disconnect the port signal cable.
02	3299-2, 3299-3 Port Wrap	00 – 07	Logical Port 00 – 07	Disconnect the 3299 output port signal cable.
03	Terminal Path Test	00 – 07	Logical Port 00 – 07	Terminal attached and powered on.
04	CUT Display Exerciser	00 – 07	Logical Port 00 – 07	Terminal attached and powered on.
05	Terminal Adapter Wrap All			Disconnect port 00 – 03 signal cables.
06	3299-2, 3299-3 Wrap All	00	Terminal Adapter Port Number	Disconnect the output signal cables from the 3299.
07	Printer Exerciser Test	00 – 31	Logical Port 00 – 31	Printer attached, powered on and ready.
20	Reserved			

Terminal Adapter Function Numbers/Parameters Description

The following paragraphs describe the port wrap function numbers. Figure 2-22 on page 2-80 shows the terminal attachment.

Terminal Adapter Port Wrap (FN 01): This function number provides an internal wrap test on the individual ports on the terminal adapter. 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.

3299 Model 2,3 Port Wrap (FN 02): This function number provides an internal wrap of the individual output ports on a 3299 Terminal Multiplexer Models 2 and 3. The function parameter is used to specify the logical port number to be wrapped. 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 terminals that are directly attached to the terminal adapter or attached through a 3299 Model 1, 2, or 3. The function parameter is used to specify the logical port number of the terminal to be tested. The path is automatically determined by the diagnostic. 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 3299 Model 1, 2 or 3. 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. Status code 4050 indicates successful test completion. Status code 3041 and 3042 indicate the test failed.

Terminal Adapter Wrap All (FN 05): This function number provides an internal wrap test of the nine ports on the terminal adapter. A function parameter is not required for this function number. Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

3299 Model 2,3 Wrap All (FN 06): This function number provides an internal wrap of the eight output ports on a 3299 Model 2 or 3. The function parameter is used to specify the port number on the terminal adapter that the 3299 is attached to.

Note: Wrap tests FN 02 and 06 cannot be performed on 3299 Terminal Multiplexer Model 1.

Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

Note: Function numbers 05 and 06 run on the terminal adapter logic when 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 3299 Model 1, 2 or 3. 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. This test is restricted to 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.

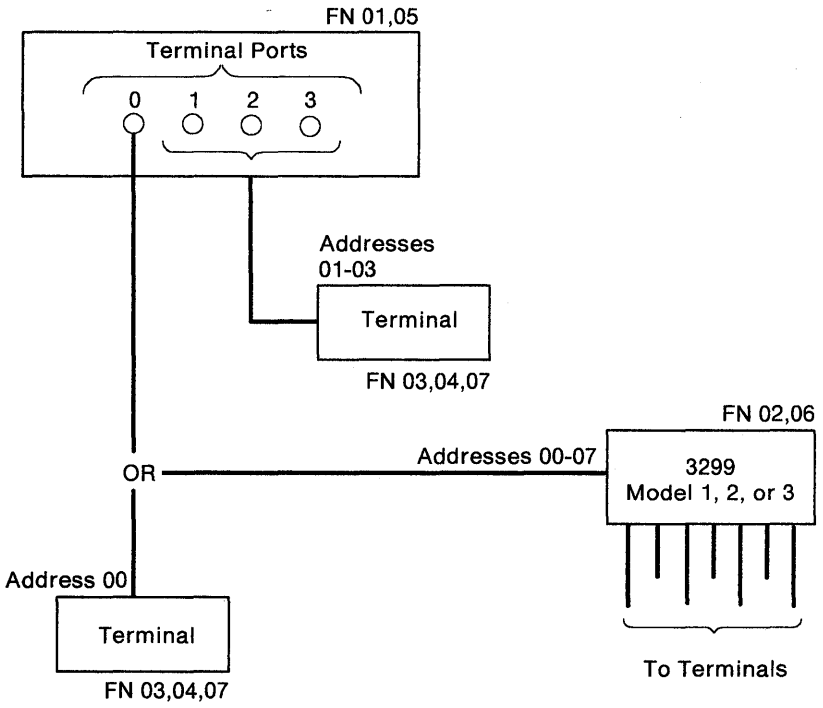


Figure 2-22. Block Diagram of Terminal Attachment

Diagnostic Aids: 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 2-122). 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 2-23 on page 2-83.

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 2-85.

/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 2-86. 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 2-92.

/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 2-94.

/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 2-99.

/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 2-100.

/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 2-103.

/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 2-115.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-115.

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 2-116.

/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 2-117.

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controller. For detailed information about Test A, see page 2-120.

3174 Test Menu

To display the 3174 Test Menu, shown in Figure 2-23, 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 2-23. 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 **/1,3,1** will display the log records for HG01.

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 **3,1**
   The log records for HG01 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 2-24 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 2-24. 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 2-25, 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 2-25. 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 2-26.

```
                        _____ 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 2-26. Event Log Summary (Example)

Log Records Example:

Figure 2-27 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 2-27. 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 2-15.

Table 2-15. 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 2-28 on page 2-90.

```
                                @ = 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 2-28. 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 2-99. 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 2-29 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 2-29. 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             09 9523 07 Ops Panel Assembly
  01 9113 01 Diskette 1 - 1.2MB   32XX     11 9160 03 Type 1 Com Adpt-XXX
  01 9160 03 File Adpt                     87 9160 03 Processor
  08 9160 03 Timer                         87 9160 03 Storage 2MB
  09 9160 03 Ops Panel 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 81R. 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 2-30. 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 2-31 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 2-31. 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 2-32. 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 dual control unit multiplexer.
x	=	A terminal that is configured only for another controller through a dual control unit 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 dual control unit 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 2-33. 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 2-34. 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 2-35. 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 2-36 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 2-36. 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 2-37 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 2-37. Vital Data Menu

Option 1. Select option 1 on the Vital Data Menu to display the Controller Vital Data panel. See Figure 2-38 on page 2-101.

Option 2. Select Option 2 to display the Port Vital Data panel. See Figure 2-39 on page 2-102.

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 2-38. 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 customization.

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 2-39. 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 2-40. 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 2-41 on page 2-104. 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 2-42 on page 2-105 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 2-43 on page 2-111 shows the host control data for X.21 short-hold mode. Figure 2-44 on page 2-113 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   1234   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   1111   2222   3333   4444   1111   2222   3333   4444

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

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

Figure 2-41. Port Control Area Panel

Note: To analyze the information contained on this panel, see "Port Control Area Bit Definitions" on page 2-106.

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 2-42. 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 2-108.

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 2-16 (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	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 If Bit 2=0 / If 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 2-16 (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 2-16 (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 2-17 (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 2-17 (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 2-17 (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 2-17 (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 2-17 (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 2-17 (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 2-43 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 2-43. 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 2-18 on page 2-112 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-43.

Table 2-18. X.21 XID Summary

Location	Bit	Meaning
Byte 00[1]		Format of XID I-field and PU type of the sender
	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 12–31	The product block number 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
	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
Bytes 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.

Table 2-18. X.21 XID Summary

[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 2-44. 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 2-18 on page 2-112, "Link Counters" on page 2-114, and "Circuit Counters" on page 2-114.

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 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 2-45. 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 2-45. 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 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.

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 2-81). 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.

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 2-46 on page 2-125.

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 2-127.

/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 2-128. The following types of error logs can be displayed:

/1,1	—	Response time log for requestors active host ID
/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 2-134.

/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.
/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 2-136.

/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 2-142.

/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 2-143.

/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 2-146.

/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 2-158.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-158.

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 2-159.

/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 2-160.

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 2-163.

3174 Test Menu Configuration B

To display the 3174 Test Menu, shown in Figure 2-46, 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 2-46. 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 **/1,3,1** will display the log records for HG01.

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 **3,1**
   The log records for HG01 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 2-47 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 2-47. 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 2-48, 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 1R 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 2-48. 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 **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 2-49.

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 2-49. Event Log Summary (Example)

Log Records Example

Figure 2-50 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 2-50. 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 host address that was active when the status code was logged.

HA Field

HA = The Host Address, if the error is related to attached terminals. The HA 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 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 2-51.

```
                        _____ 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 2-51. 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 2-142.

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, and the Asynchronous Emulation adapter configuration. When Test 2 is selected, the menu shown in Figure 2-52is 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 2-52. Test 2 Menu

Option 1. The panel shows the hardware configuration. See Figure 2-53 on page 2-135.

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             09 9523 07 Ops Panel Assembly
 01 9113 01 Diskette 1 - 1.2MB   32XX     11 9160 03 Type 1 Com Adpt-XXX
 01 9160 03 File Adpt                     87 9160 03 Processor
 08 9160 03 Timer                         87 9160 03 Storage 2MB
 09 9160 03 Ops Panel 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 81R. 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 2-53. 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 2-54 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. 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 2-54. 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 2-55. 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 dual control unit multiplexer.
x	=	A terminal that is configured only for another controller through a dual control unit 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 dual control unit 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 3270 Device Status Menu is displayed. 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 2-56. 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-

       LT   Bound   Host    IDn      HG_PN   Host/Station Name
                    Addr

      (No host connectivity configured)




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

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

Figure 2-57. 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 2-58. 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 2-59. Status Summary

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 2-55 on page 2-137 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. The menu shown in Figure 2-60 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
     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 2-60. 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 2-61 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 2-61. Vital Data Menu

Option 1. Controller Vital Data Menu.
See Figure 2-62 on page 2-144.

Option 2. This option is valid only from 1TEST. Port Vital Data panel. See Figure 2-63 on page 2-145.

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 2-62. 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 2-63. 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 2-64. 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 2-65 on page 2-147. 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 2-66 on page 2-148 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 2-67 on page 2-154 shows the host control data for X.21 short-hold mode. Figure 2-68 on page 2-156 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 2-65. 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 2-66 on page 2-148 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 2-65. Port Control Area Panel

Note: To analyze the information contained on this panel, see "Port Control Area Bit Definitions" on page 2-149.

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, 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 2-108.

Figure 2-66. LT Control Area Panel

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.

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 If Bit 2=0 / If 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
	7	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
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
	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 2-21 (Page 1 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.

Table 2-21 (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	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
	5–6	Chain receive 00 = Receive between chain 01 = Receive in chain 11 = Receive purging 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
	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 2-67 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 2-67. 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 2-155 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-67.

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

[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

Location	Bit	Meaning
	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.

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 2-68. 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 2-155, "Link Counters" on page 2-157, and "Circuit Counters" on page 2-157.

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 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 2-69. 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 2-69. 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.

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

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 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
--------------------------------------------------------------------
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn ------------------------------
Q1 mmmmmmmm Q2 mmmmmmmm Q3 mmmmmmmm
```

Figure 2-70. 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.

General Procedures

This section describes the following procedures:

- How to display the Master Menu
- How to perform an operator panel lamp test
- How to perform the coaxial cable ground loop check
- How to check for a terminal-ready condition
- How to use the 3174 patch procedure
- How to perform the 3174 dump procedure.

How to Perform an Operator Panel Lamp Test

To test the light emitting diodes (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 2-71) 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:

1. Insert the Utility diskette into the diskette drive.
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.

```
                          __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 2-71. The Master Menu

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™ 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.

NetView is a trademark of the International Business Machines Corporation.

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 2-168.
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.

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.

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 its mode that allows communication with the 3174.
3. If the ready condition is on, the terminal and the port the terminal 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 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 that all patch data has been keyed in correctly. Sixty patches can be installed on the Control diskette and 60 on the Utility diskette.

PC Patches

PC patches are applied only to the link-edited microcode that is on the Control diskette. 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 display on the patches panel of the Control diskette. 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 PF 8 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 or Utility diskette. Zap patches are prefixed with the letters ZC or ZU. ZC means the patch is applied to the microcode on the Control diskette. ZU means the patch is applied to the microcode on the Utility diskette.

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 or Utility diskette.

Starting the Patch Procedure

1. Insert the Utility diskette.
2. Perform an Alt 1 IML. See "Obtaining the Alt 1 IML 40 Prompt Message" on page 2-39.
3. At 40, press ENTER.
4. Go to the terminal connected to port 0.

   The Master Menu is displayed. See Figure 2-72.

```
                    _____ Master Menu _____

Select Option:  press Enter

1.  Customize the Control Diskette
2.  Merge DSL
3.  Copy Files
4.  Diagnostics
5.  Microcode Upgrade
6.  Encrypt/Decrypt Master Key
K.  Identify Customizing Keyboard




Select ===> _
```

Figure 2-72. Master Menu

5. Type in **P**
6. Press ENTER. The Patch Menu is displayed on your screen. See Figure 2-73.

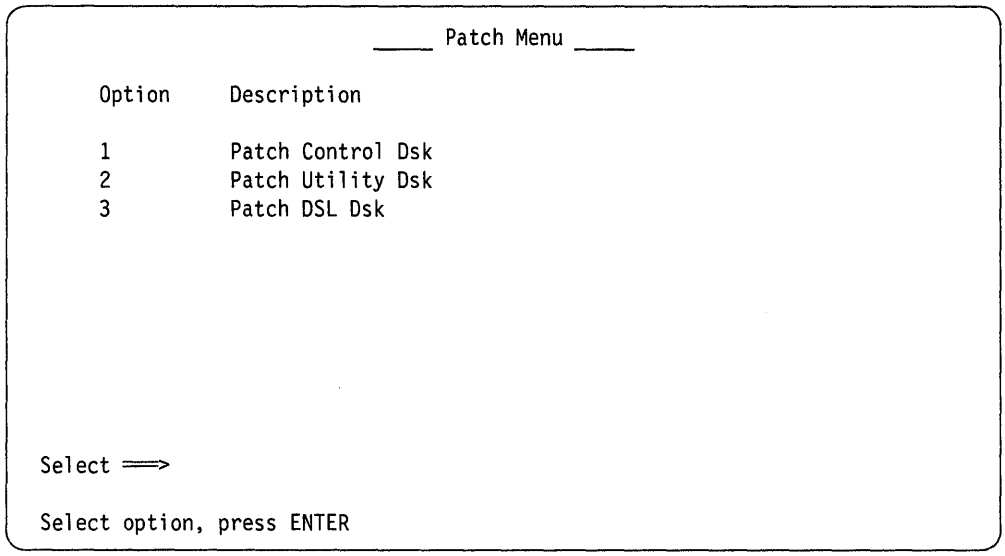


Figure 2-73. Patch Menu

7. Select the Option number of the diskette you are patching.
8. Press ENTER. The following panel is displayed on your screen and the line containing the selected diskette is highlighted.

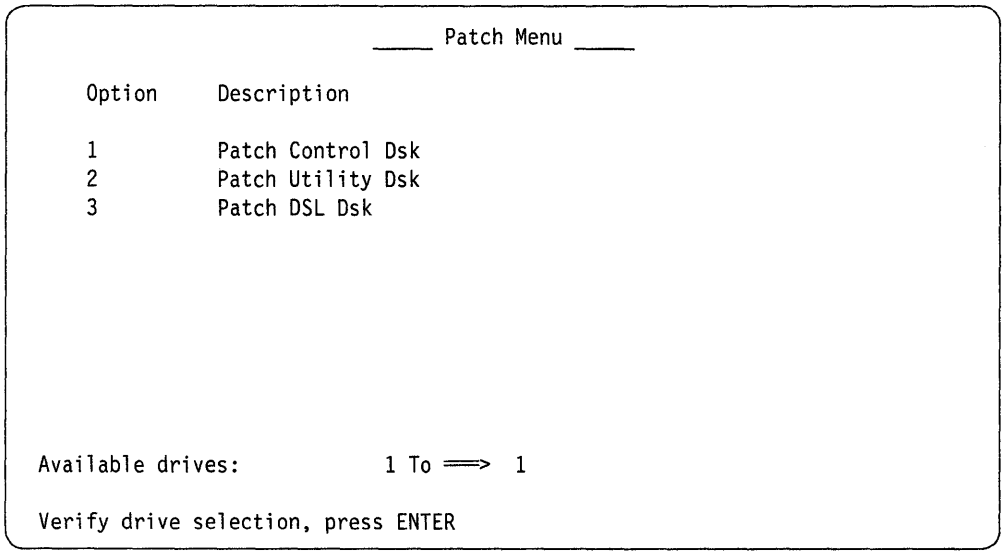


Figure 2-74. Diskette Drive Selection Menu

9. Type in **1** for your *To* (or target) drive.
10. Press ENTER. The following panel is displayed on your screen.

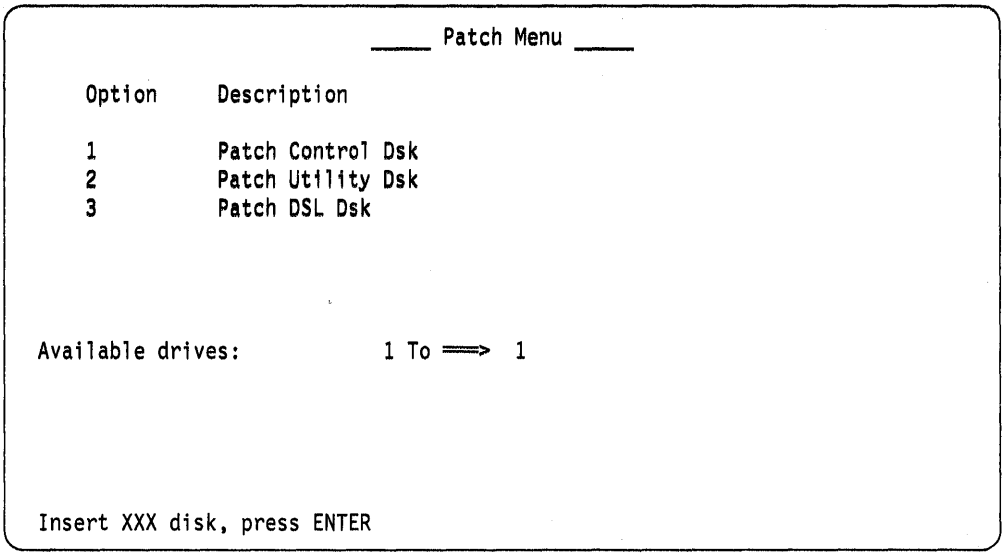


Figure 2-75. Diskette Drive Selection Menu

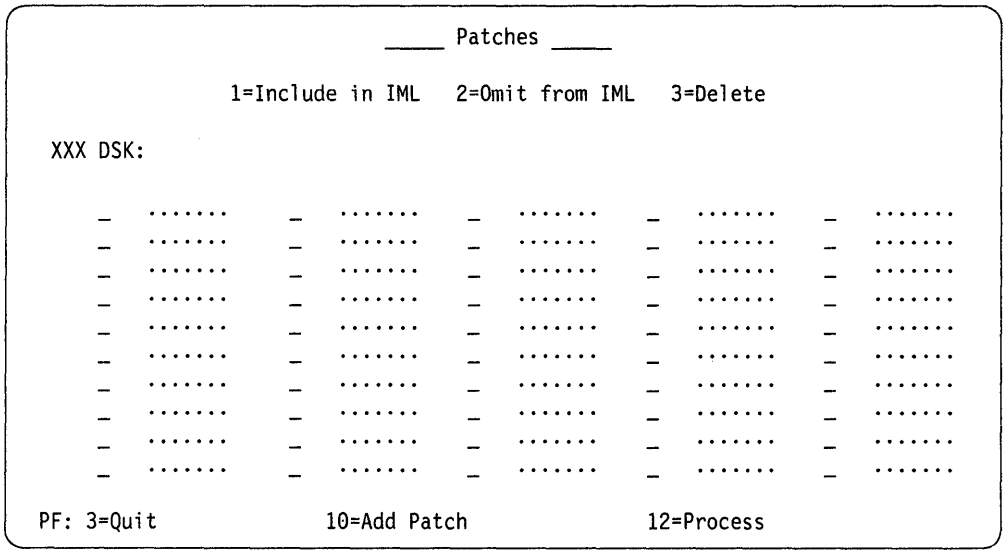
XXX = the diskette you selected to patch.

11. Insert the selected diskette into the diskette drive.
12. Press ENTER.

    The Patches panel is displayed (see Figure 2-76 on page 2-173).
    To add a patch, go to "Adding a Patch" on page 2-173.
    To add a Zap patch, go to "Adding a Zap Patch" on page 2-176.
    To process a patch, go to "Processing an Existing Patch" on page 2-178.

Adding a Patch

The Patches panel shown in Figure 2-76 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 diskette you selected to patch.

Figure 2-76. Patches Panel

1. Press PF10.

   The following panels display:

   a. Patch Header Panel (see Figure 2-77 on page 2-174)
   b. Patch Data Panel (see Figure 2-78 on page 2-174)
   c. Relocatable Information Panel (see Figure 2-79 on page 2-175)
   d. Call to Patch Area Panel (see Figure 2-80 on page 2-175).

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 that 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 2-77. 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 2-78. Patch Data Panel

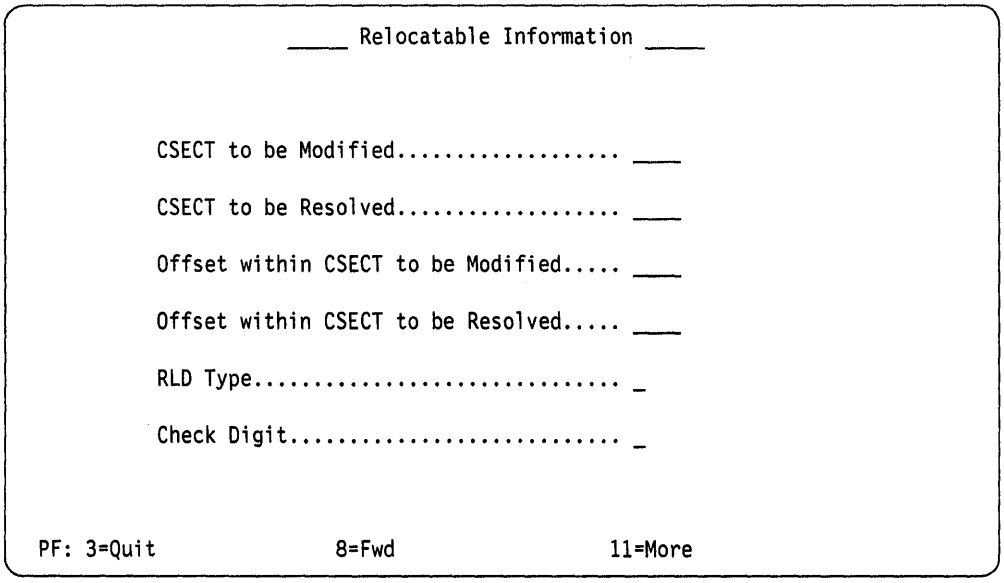


Figure 2-79. Relocatable Information Panel

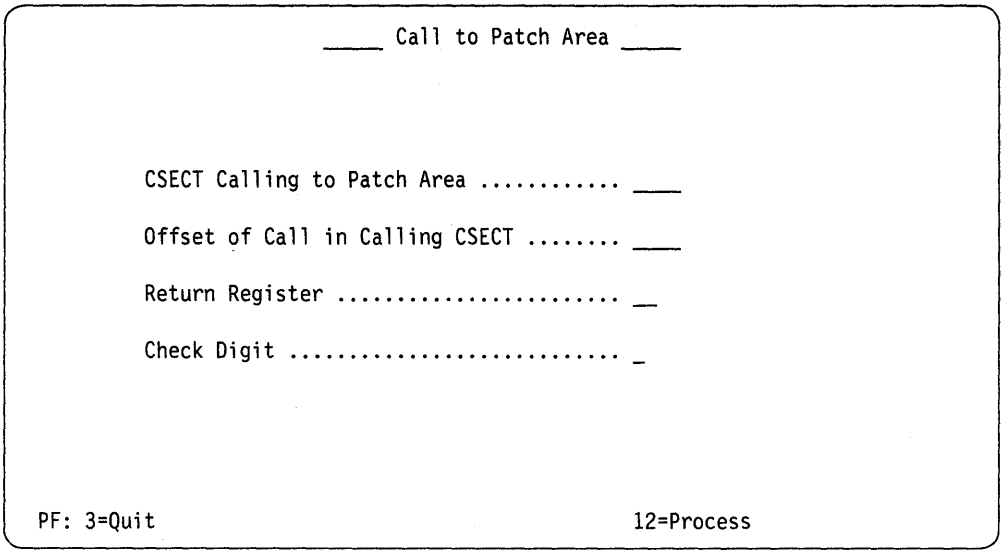
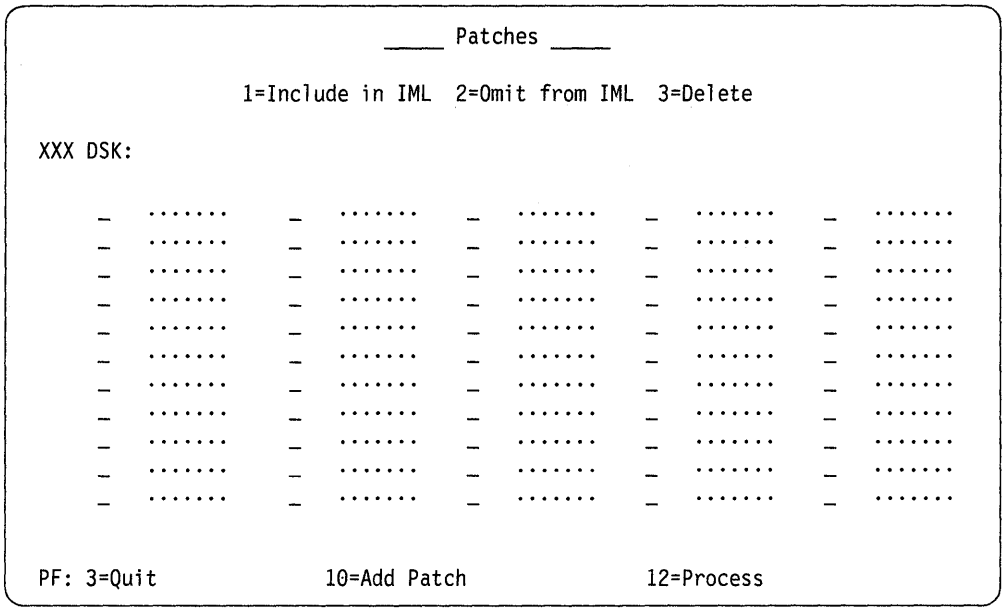


Figure 2-80. Call to Patch Area Panel

Adding a Zap Patch

Figure 2-81 shows the Patches panel before a zap patch is added.



XXX = the diskette you selected to patch.

Figure 2-81. Patches Panel (Adding a Zap Patch)

1. Press PF10.

The following panels are displayed:

   a. Patch Header panel (see Figure 2-82 on page 2-177).
   b. Zap Patch panel (see Figure 2-83 on page 2-177).

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.

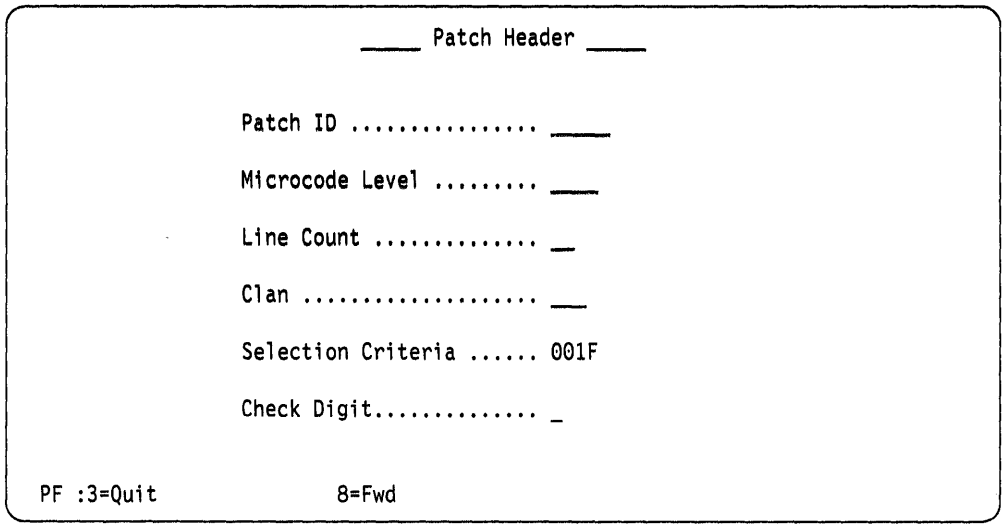


Figure 2-82. Patch Header Panel (Adding a Zap Patch)

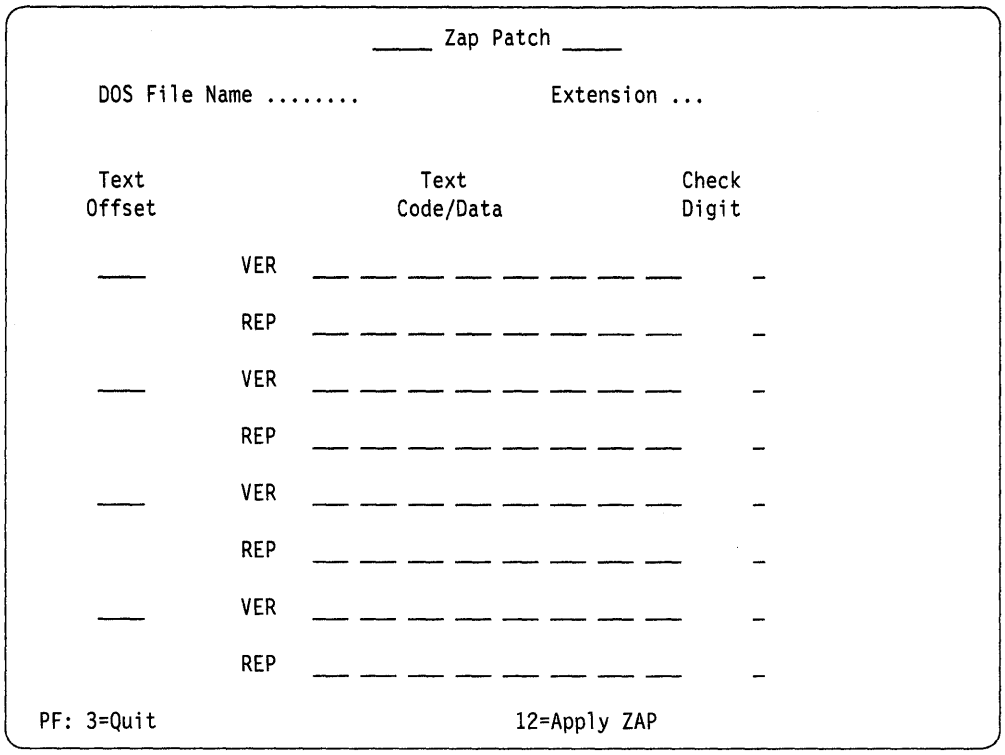


Figure 2-83. Zap Patch Panel

Processing an Existing Patch

The panel in Figure 2-84 shows one patch installed on the Control diskette. 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 diskette.

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   P111111     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......
     _   .......     _  .......    _  .......    _  .......    _  .......

PF: 3=Quit              10=Add Patch              12=Process
```

Figure 2-84. Patches Panel with One Patch Installed

How to Perform the 3174 Dump

The 3174 dump procedure is a standalone program that is contained on its own diskette. The dump diskette (PN 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 Memory Mapped I/O (MMIO)
- Control Diskette Link-Edit Map
- Control Diskette Configuration Files
- Control Diskette 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: A second dump diskette may be required to dump all of machine storage.

1. Remove the diskette from the diskette drive.
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. At 31, release Alt 1.
6. At 40, press Enter.
7. The following status codes are displayed:
   5901 5902 5903 5904 5905
8. At 5907, remove the dump diskette and insert the Control diskette.

   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.
11. The following status codes are displayed:
    5912 5913
12. If status code 5914 is displayed, remove the dump diskette and insert a second dump diskette. If 5914 is not displayed, continue with the next step.
13. At 5916, remove the dump diskette. The dump is completed. Save this diskette for analysis.
14. If 5917 or 5918 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 "Alt 2 IML (Test 82) Procedure" on page 1-24.
    d. Re-create the failure.
    e. Perform the dump procedure again.
    f. Save this dump diskette for analysis.
15. If any other status code is displayed, see the *3174 Status Codes* manual.

3174 Models 81R, 82R, 91R, and 92R Establishment Controller OLTs

These online tests (OLTs) provide path testing for the 3174 Models 81R, 82R, 91R, and 92R Establishment controller downline from a 270x or a 370x. (See Table 2-23.)

Prior to invocation, the 3174 must complete its IML sequence; that is, the operational microcode must be in control and ready for I/O operations with the host.

Applicable Executive Control Program

These OLTs are compatible with the following control programs at the levels indicated or higher:

DOS/VS OLTEP	33
OS/VS1 OLTEP	6
OS/VS2 SVS OLTEP	1.7
OS/VS2 MVS OLTEP	3.7
TCAM TOTE	10
OLTSEP	9.0
OS OLTEP	21.8
DOS OLTEP	26

Table 2-23. 3174 Models 81R, 82R, 91R, and 92R OLTs

Configuration	OLT User's Guide	OLT
3174 Models 81R and 91R, BSC operating with a 270x, or a 370x with the Emulator Program (EP)	D99-3174B	R3174A
3174 Models 81R and 91R 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
174 Models 81R, 82R, 91R, and 92R SDLC operating with a 370x NCP. Use the following Link Level Tests:		
Link Level 1	D99-3700C	T3700LTE
Link Level 2	D99-3705A	T3705

Chapter 3. Repair Information

Introduction 3-2
Locations 3-2
Removal/Replacement Procedures 3-7
Cover Removal/Replacement 3-7
Power Supply Removal/Replacement 3-8
Operator Panel Removal/Replacement 3-8
Storage Card Removal/Replacement Models 91R and 92R 3-9
Diskette Drive Removal/Replacement 3-10
Fan Removal/Replacement 3-10
Planar Board Removal 3-11

Introduction

This chapter contains 3174 locations, power supply voltage charts, DC power connector wiring, DC power connector locations, and removal/replacement procedures.

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.)

Locations

Figures 3-1 and 3-2 illustrate the front-panel and back-panel locations of the 3174.

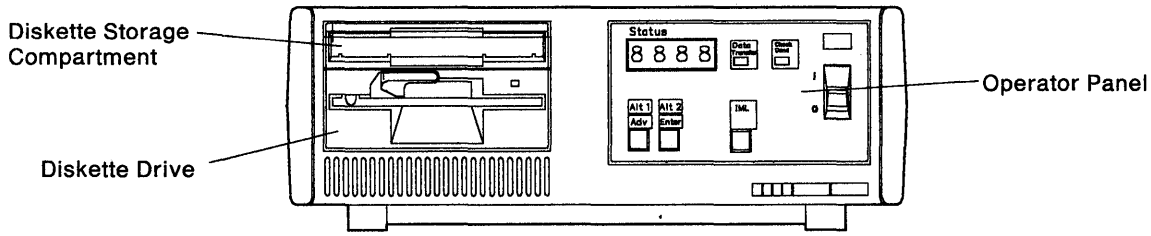


Figure 3-1. 3174 Front Panel Locations

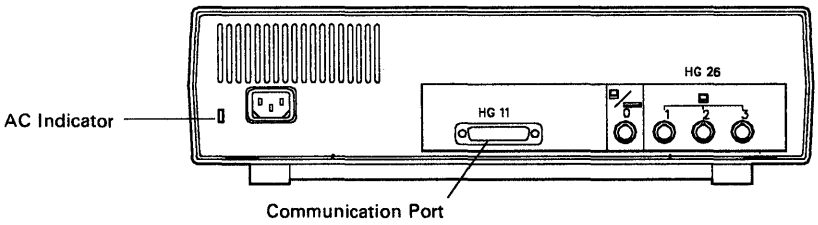


Figure 3-2. 3174 Back Panel Locations

Table 3-1. Power Supply Voltage Chart (No-Load Condition)			
		DC Limits	
Voltage	**Test Point**	**Nominal**	**Maximum**
+5.0	P1–1 (Planar) P–2 (Planar) P1–7 (Planar) P1–4 (Diskette Drive)	+5.0	+6.0
–5.0	P1–3	–5.0	–6.0
–12.0	P3–1 (Fan)	–12.0	–14.0
–12.0 –14.0	P1–8 (Planar)	–12.0	
+12.0	P1–9 (Planar) P2–1 (Diskette Drive)	+12.0	+13.2
GND	P1–4 (Planar) P1–5 (Planar) P2–2 (Diskette Drive) P2–3 (Diskette Drive) P3–2 (Fan)	Ground Return	

Notes:

1. Under normal no-load conditions, the output of the power supply should never exceed the Maximum Limit. The no-load upper limit range will vary according to how much of the "LOAD" is attached.
2. The -5Vdc and -12Vdc are not used on some models.

Example: Removing just one power connector, such as P1 (Planar), leaves the "LOAD" of P2 (Diskette Drive) and P3 (Fan) still connected to the power supply. When the voltages are measured at the P1 (Planar) connector, the voltages will tend to be high, but not as high as when all three power plugs are removed.

Table 3-2. Power Supply Voltage Chart (Normal Operating Condition)				
			DC Limits	
Voltage	**Wire Color**	**Test Point**	**Nominal**	**Maximum**
+5.0	Orange	P1–1 (Planar) P1–2 (Planar) P1–7 (Planar) P1–4 (Diskette Drive)	+5.0	+6.0
–5.0	Yellow	P1–3	–5.0	–6.0
–12.0	Blue	P3–1 (Fan)	–12.0	–14.0
–12.0	Blue	P1–8 (Planar)	–12.0	–14.0
+12.0	Red	P1–9 (Planar) P2–1 (Diskette Drive)	+12.0	+13.2
GND	Black	P1–4 (Planar) P1–5 (Planar) P2–2 (Diskette Drive) P2–3 (Diskette Drive) P3–2 (Fan)	Ground Return	

Note: The -5Vdc and -12Vdc are not used on some models.

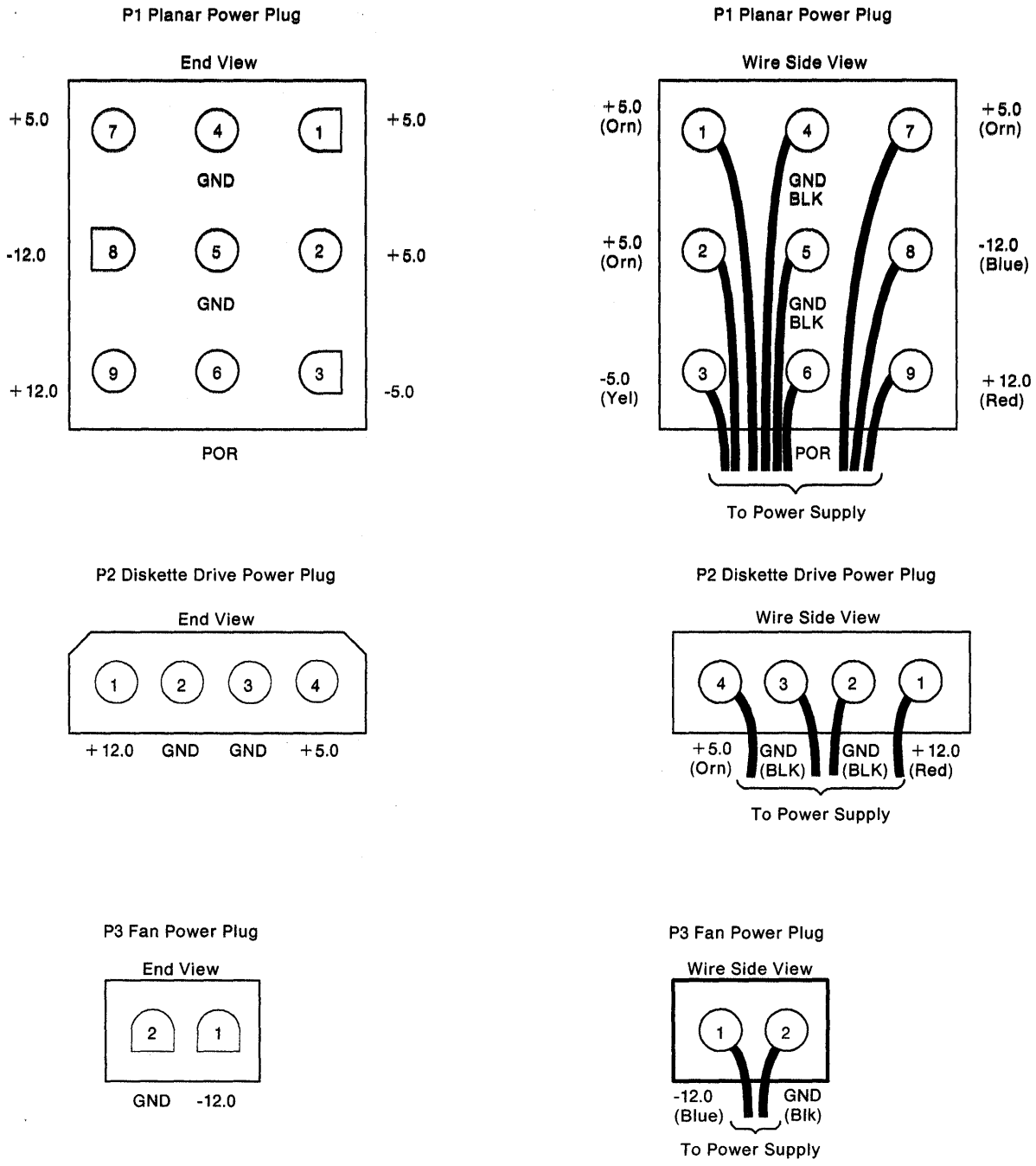


Figure 3-3. DC Power Connectors

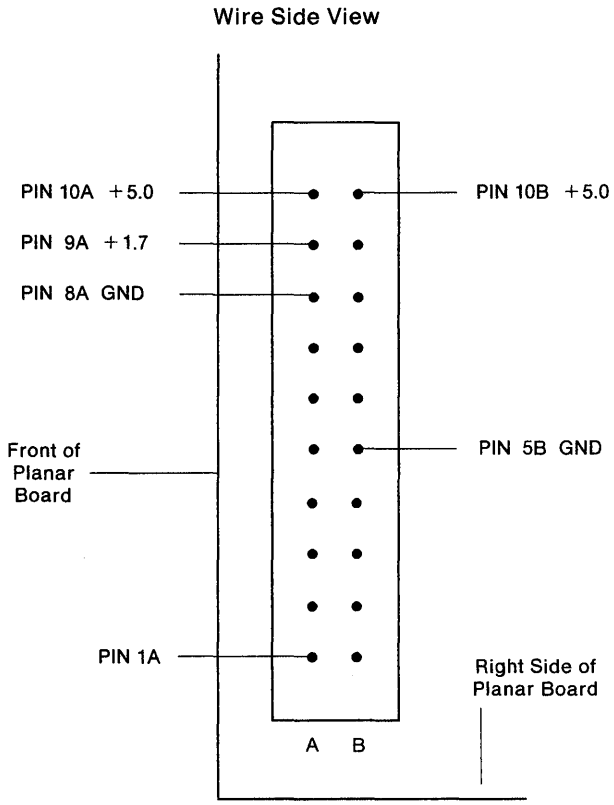


Figure 3-4. Operator Panel Connector (J10)

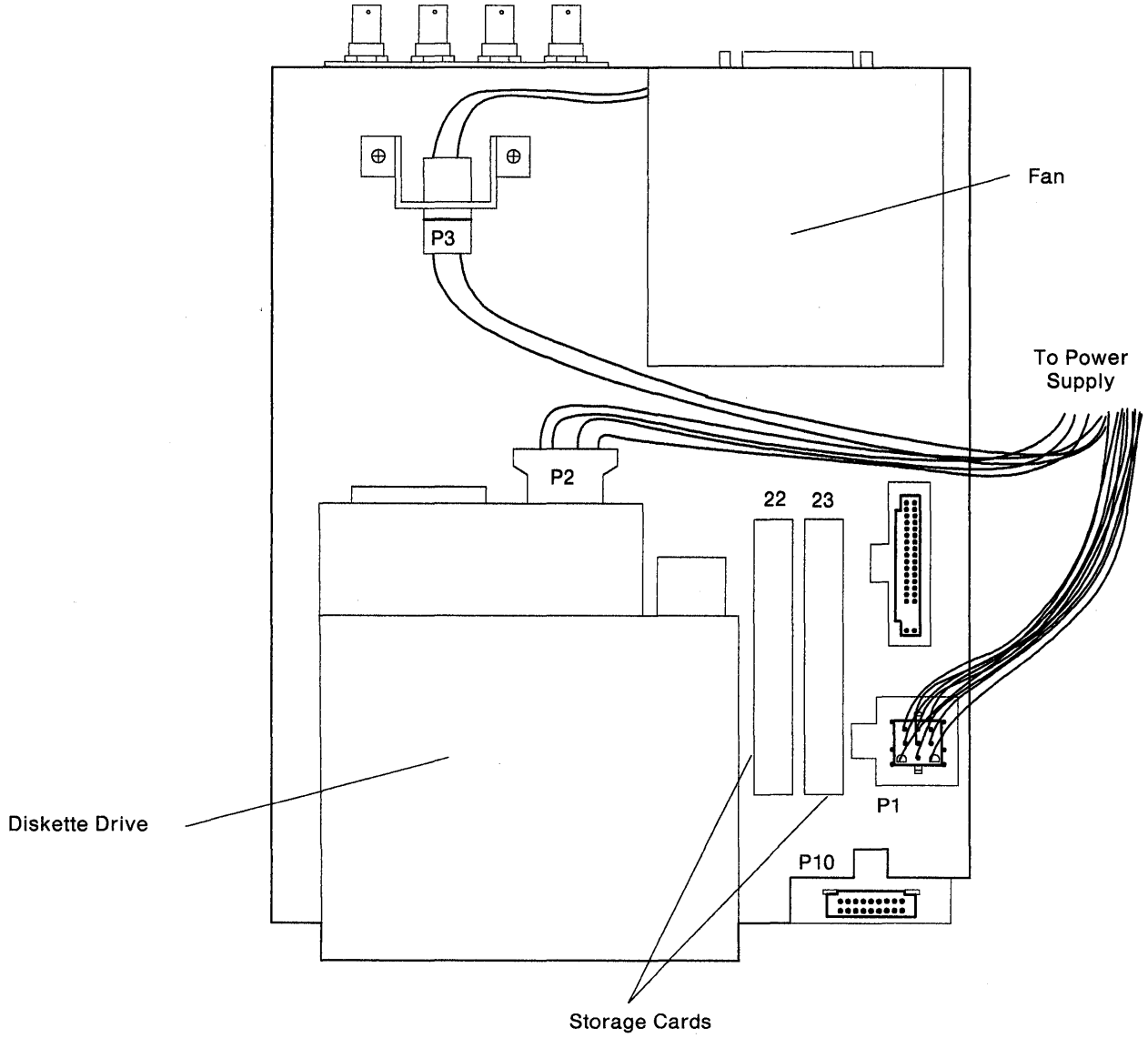


Figure 3-5. DC Power Connector Locations

Removal/Replacement Procedures

This section provides the information needed to remove and replace the front and top covers, the power supply, the operator panel, the diskette drive, the fan, and the planar board.

Cover Removal/Replacement

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of the 3174.
3. Disconnect the communication interface cable and the terminal signal cables.

   Note: See Figure 3-6 and perform the following steps to remove the covers:
4. Loosen the two superdrive screws located at the bottom front corners of the 3174.
5. Press the locking tab in and pull the bottom of the front cover away from the front of the machine. The locking tab is centered between the two screws that were loosened in step 4.
6. Remove the top cover by pressing down on the two locking tabs at the rear of the controller and sliding the cover away from the rear of the 3174. See Figure 3-6.
7. Reverse the steps and the actions to replace the front and top covers.

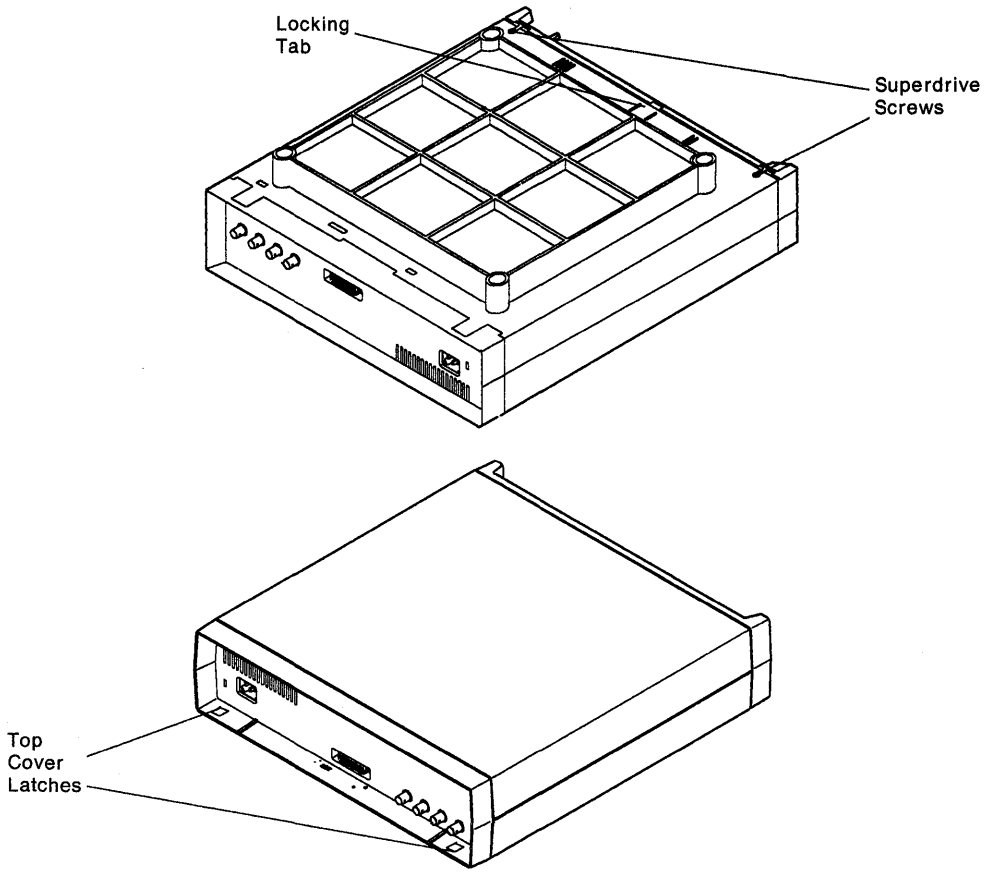


Figure 3-6. Top and Front Cover Removal/Replacement

Power Supply Removal/Replacement

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of the 3174.
3. Disconnect the communication interface cable and the terminal signal cables.
4. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.

   Note: See Figure 3-8 on page 3-12 and perform the following steps:
5. Remove three hex screws (7mm) from the top of the power supply cover and remove the cover.
6. Disconnect the following power cables:
   - Planar board power cable (P1)
   - Fan power cable (P3)
   - Diskette power cable (P2).
7. Remove the plastic grommet from the side of the power supply housing.
8. Disconnect the plastic AC actuator link. Rotate the link locking collar counterclockwise and slide it toward the front of the 3174. Pull the end of the link out of the AC actuator.
9. Remove the hex screw (7mm) from the end of the green/yellow ground wire.
10. Remove the two power supply mounting screws (7mm).
11. Lift up on the power supply and disengage the four plastic locking tabs one at a time to complete the removal procedure of the power supply.
12. Reverse the steps and actions to replace the power supply.

Operator Panel Removal/Replacement

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of 3174.
3. Disconnect the communication interface cable and the terminal signal cables.
4. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.

   Note: See Figure 3-8 on page 3-12 and perform the following steps:
5. Remove three hex screws (7mm) from the top of the power supply cover and remove the cover.
6. Disconnect the plastic AC actuator link. Rotate the link locking collar counterclockwise and slide it toward the front of the 3174. Pull the end of the link out of the AC actuator.
7. Disconnect the operator panel signal cable.
8. Pull the operator panel assembly away from the front of the 3174. Slide the operator panel signal cable to the left to clear the machine frame.
9. Disengage the four plastic locking tabs to remove the operator panel logic card from the operator panel assembly.
10. Remove the two screws that secure the power switch to the operator panel assembly.
11. Reverse the steps and actions to replace the operator panel.

Storage Card Removal/Replacement Models 91R and 92R

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of 3174.
3. Disconnect the communication interface cable and the terminal signal cables.
4. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.
5. Loosen the retaining screw at each end of the storage card in location 22 or 23 and pull straight up on the card.
6. Reverse the above steps to replace the card.

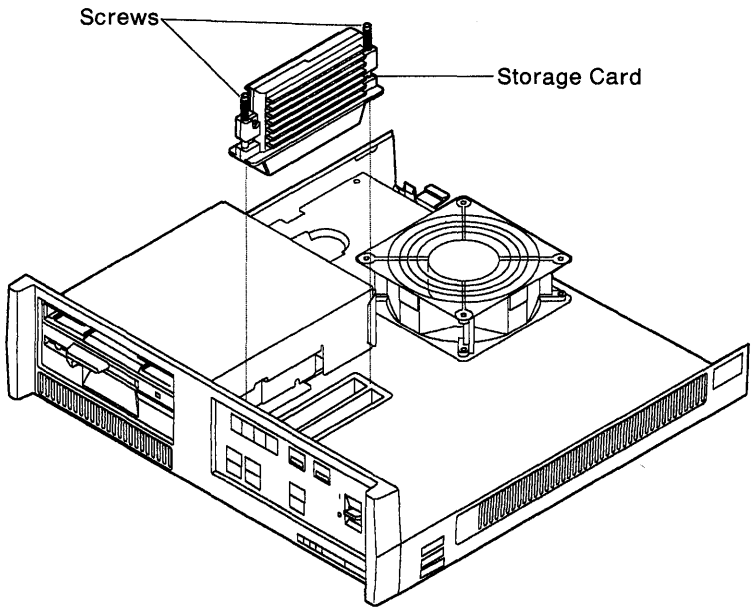


Figure 3-7. Storage card removal/replacement

Diskette Drive Removal/Replacement

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of 3174.
3. Disconnect the communication interface cable and the terminal signal cables.
4. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.

   Note: See Figure 3-8 on page 3-12 and perform the following steps:
5. Disconnect the planar board power cable (P1).
6. Disconnect the fan power cable (P3).
7. Disconnect the diskette drive power cable (P2).
8. Disconnect the diskette drive signal cable from the planar board and the diskette drive.
9. Remove the three plenum mounting screws (7mm).
10. Remove the four slotted diskette drive mounting screws.
11. Reverse the steps and actions to replace the diskette drive.

Fan Removal/Replacement

1. Disconnect the power cable from the power outlet and the rear of 3174.
2. Disconnect the communication interface cable and the terminal signal cables.
3. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.

   Note: See Figure 3-8 on page 3-12 and perform the following steps:
4. Disconnect the fan power cable.
5. Remove the four fan mounting screws.
6. Reverse the steps and actions to replace the fan.

Planar Board Removal

Note: Follow the normal electrostatic discharge (ESD) procedures when removing and replacing the planar board.

1. Switch off AC power.
2. Disconnect the power cable from the power outlet and the rear of 3174.
3. Disconnect the communication interface cable and the terminal signal cables.
4. Remove the front and top covers. See "Cover Removal/Replacement" on page 3-7.

   Note: See Figure 3-8 on page 3-12 and perform the following steps:
5. Remove three hex screws (7mm) from the top of the power supply cover and remove the cover.
6. Disconnect the following power cables:
   - Planar Board power Cable (P1)
   - Fan power cable (P3)
   - Diskette power cable (P2)
   - Diskette signal cable
   - Operator panel signal cable (P10).
7. Remove the three plenum mounting screws (7mm) and remove the plenum.
8. Remove the two planar board mounting screws (7mm).
9. Disengage the three locking tabs located near the rear of the 3174.
10. Slide the planar board toward the rear of the 3174 to remove it.
11. Reverse the steps and actions to replace the planar board.

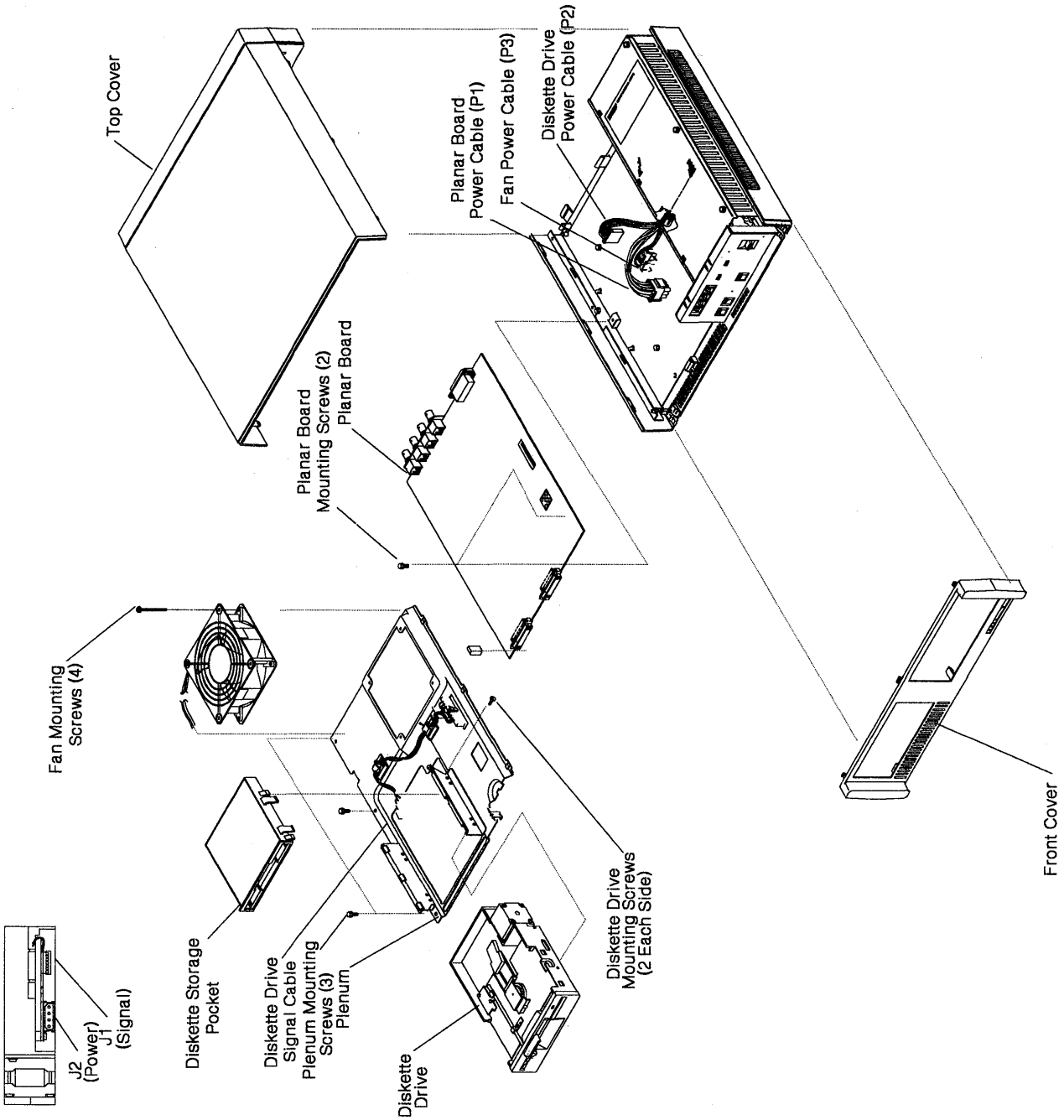


Figure 3-8 (Part 1 of 2). FRU Removal/Replacement

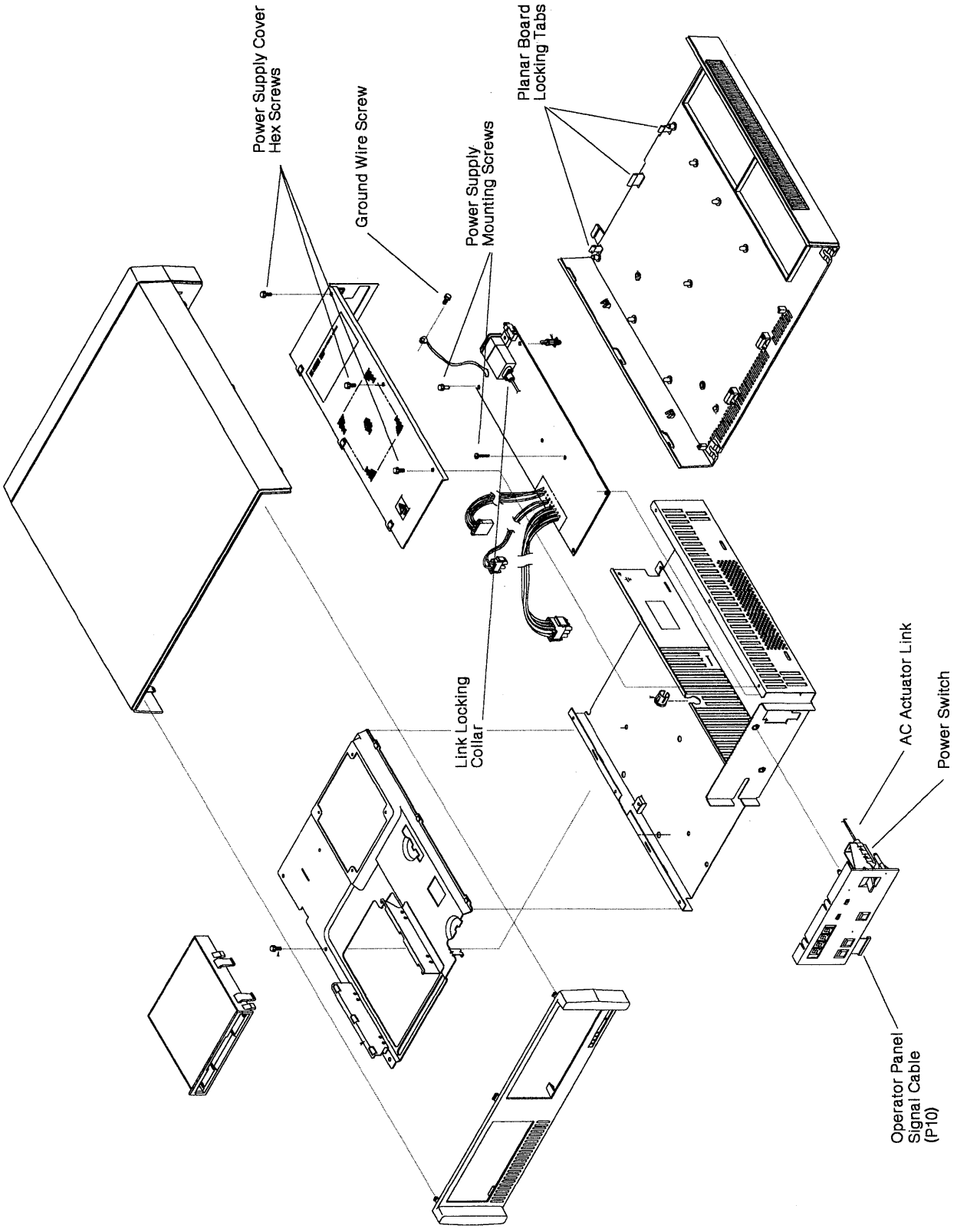


Figure 3-8 (Part 2 of 2). FRU Removal/Replacement

Chapter 4. Safety Inspection Guide

Introduction 4-2
Preparation 4-2
General Checklist Guidelines 4-2

Introduction

This chapter is a guide to inspecting 3174 Establishment Controller Models 81R, 82R, 91R, and 92R 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 (ECs) 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.

Perform the following checklist procedure 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 machine frame with a voltage potential that is above ground potential can cause a 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

☐ Enter the machine serial number.

Check

☐ Check that machine power is off and the mainline power cable is disconnected before you start this procedure.
☐ Check that the power cable is not frayed or damaged.

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 planar board to the frame housing. See Figure 4-1 on page 4-4.
  Those that secure the power supply. See Figure 4-1 on page 4-4.
- ☐ Check that the yellow/green ground wire on the AC line filter is connected to the machine frame. See part 2 of Figure 3-8 on page 3-12.

Check for Machine Labels:

- ☐ Verify that labels are installed as indicated in Figure 4-1 on page 4-4.
- ☐ Verify that the voltage label matches the voltage stamp on the top of the power supply.

Power Plug Ground Check

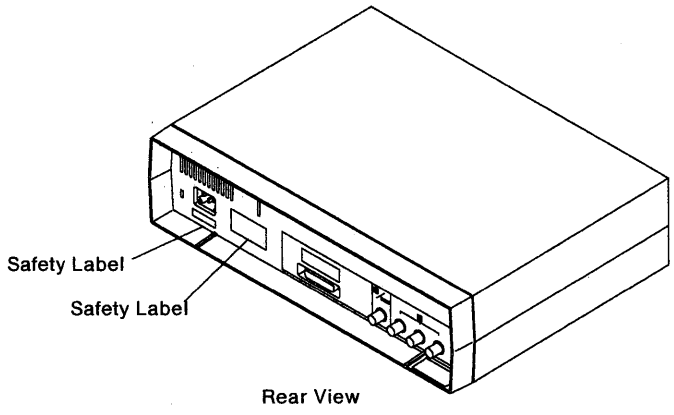
- ☐ With a CE meter set to the RX1 range, check continuity between the ground pin on the power plug and the machine frame. The reading should be 0 ohm.

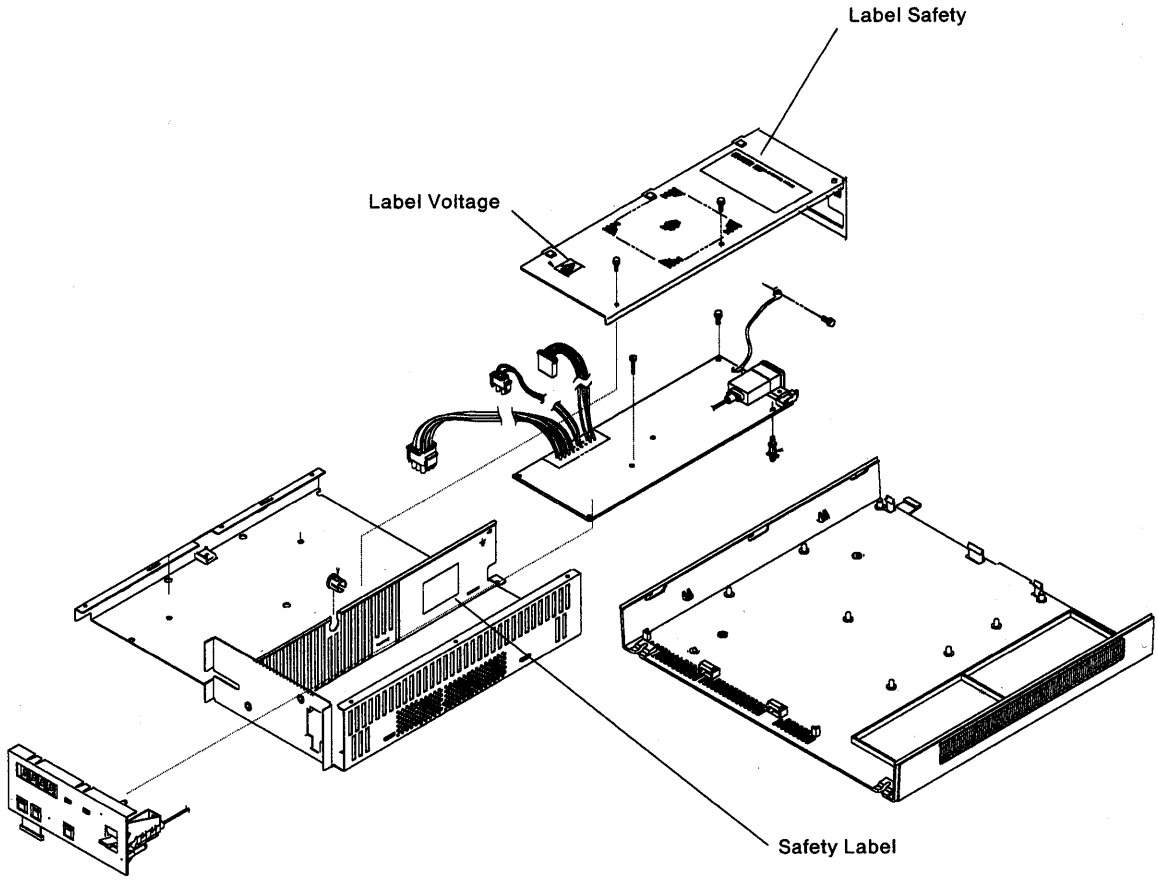
Test Verification

Run either of the following tests:

- ☐ Test All 81 (CSU). See "Alt 1 IML Description" on page 1-22.
- ☐ Alt 2 IML. See "Alt 2 IML (Test 82) Procedure" on page 1-24.

Investigate any failure before releasing the machine for customer use.





Note: See pages 5-10 through 5-13 (Parts Section) to obtain the part numbers for the safety labels installed in this control unit.

Figure 4-1. 3174 Safety Label Locations

Chapter 5. 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

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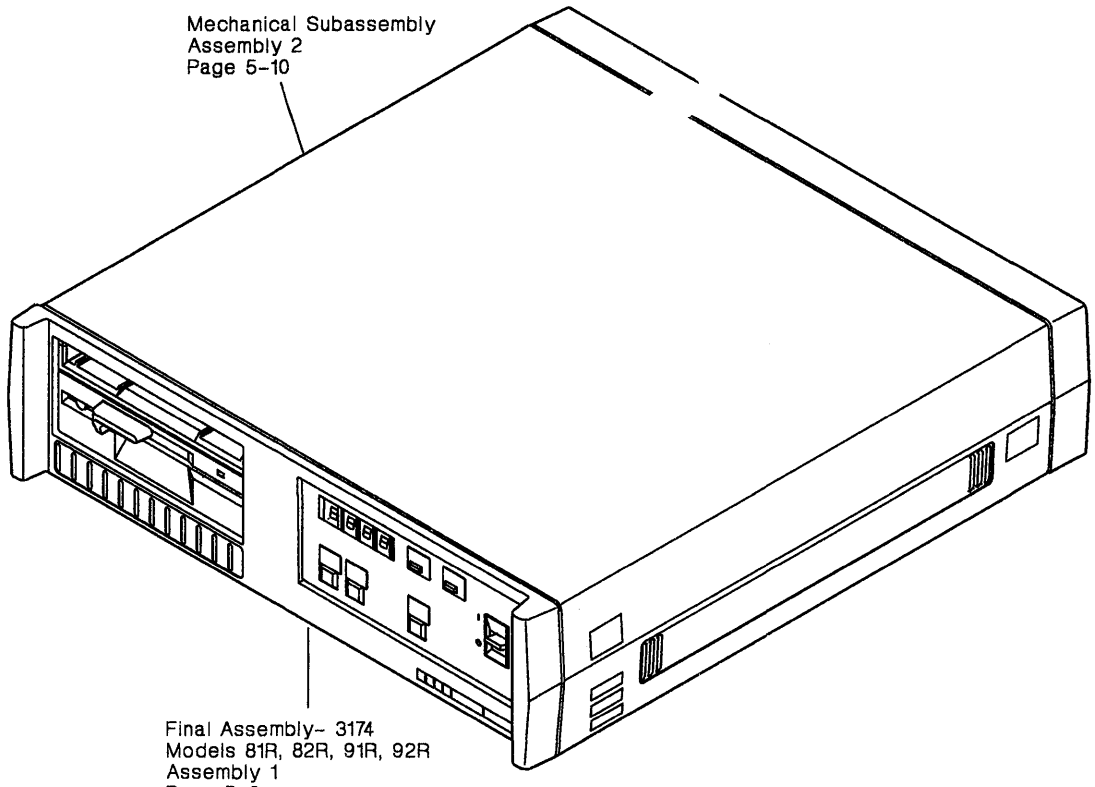
Mechanical Subassembly 5-10

Visual Index I.Final Assembly- 3174 Models 81R,82R,91R and 92R



Cable Assemblies With
Component Parts
Assembly 3
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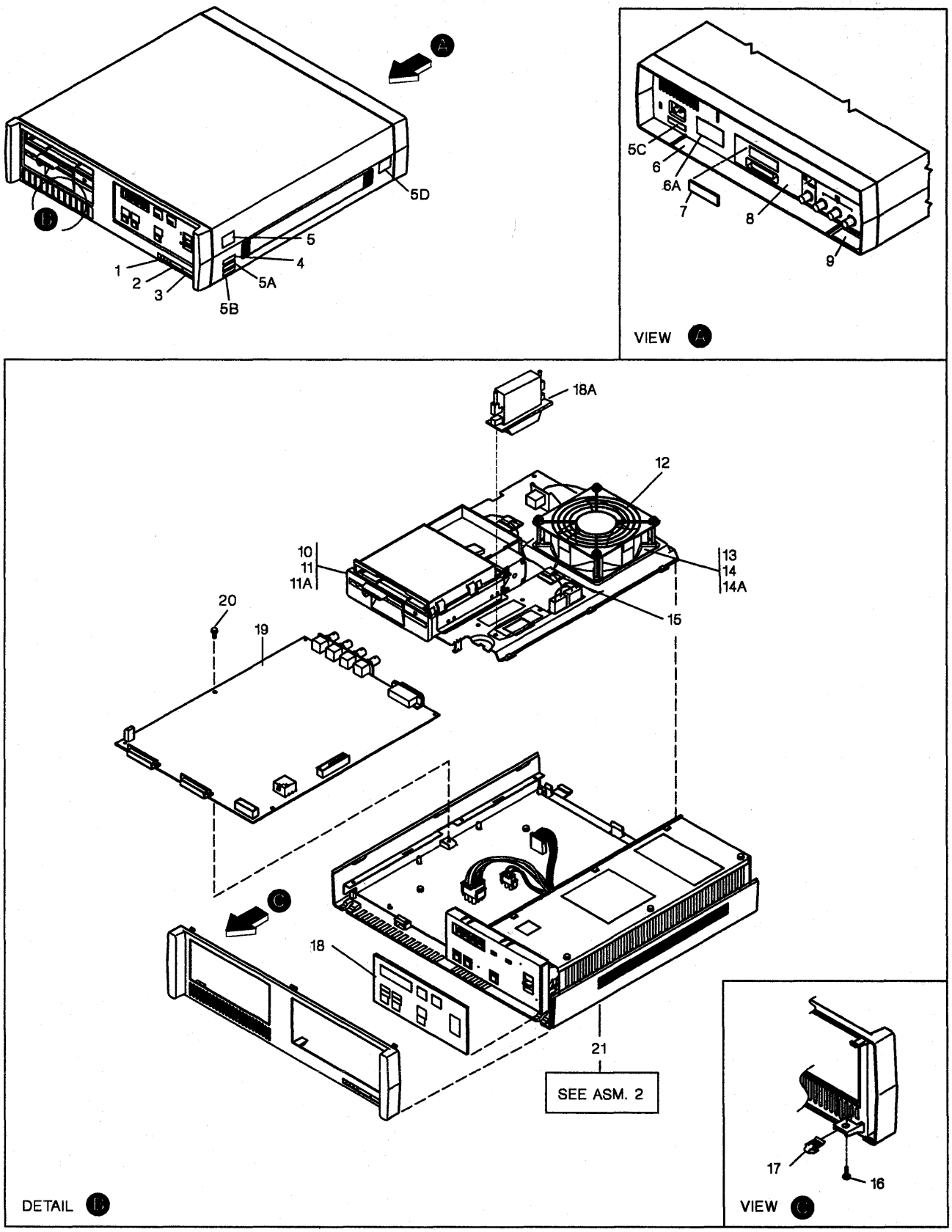
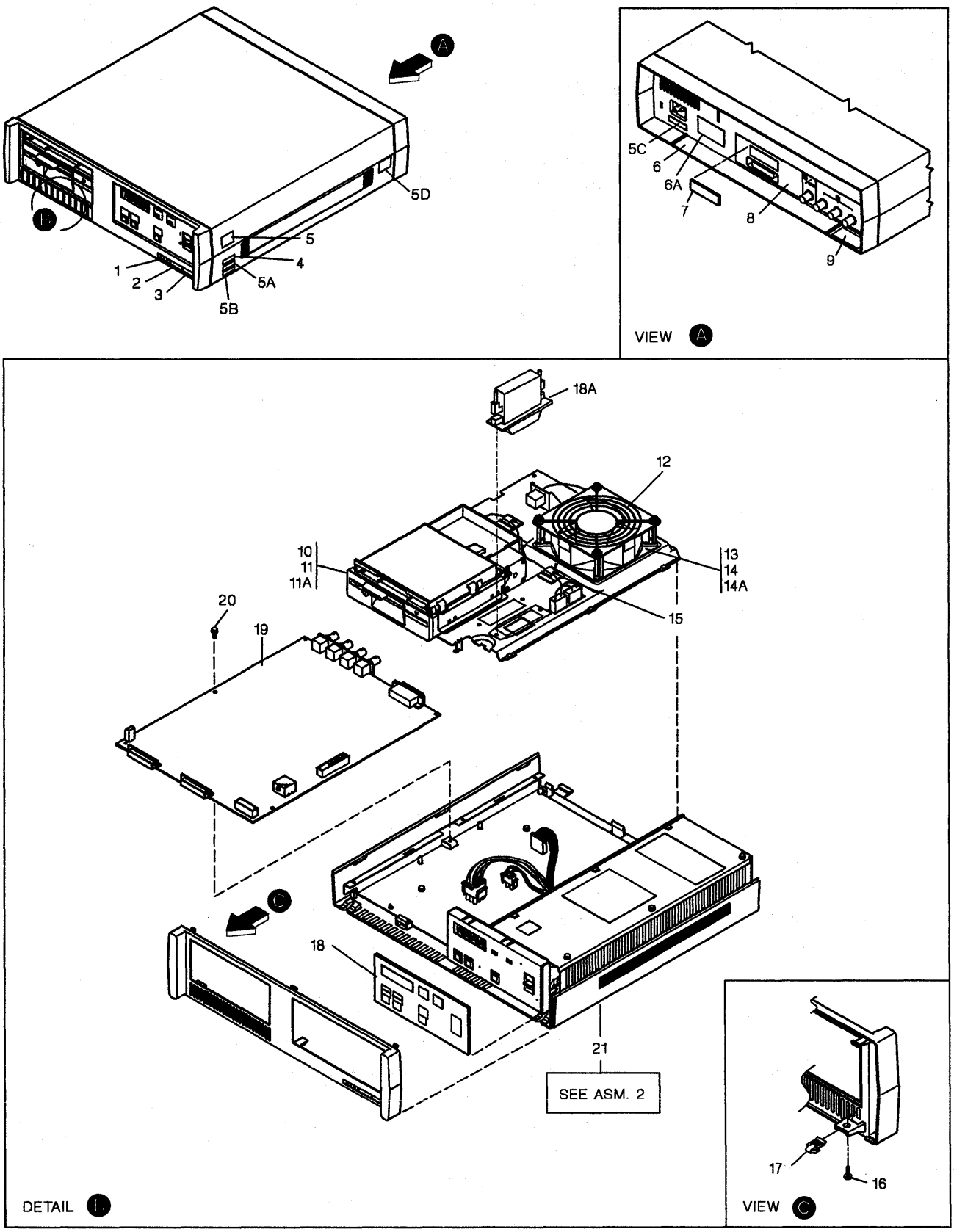
Catalog Section

Assembly 1: Final Assembly- 3174 Models 81R,82R,91R and 92R

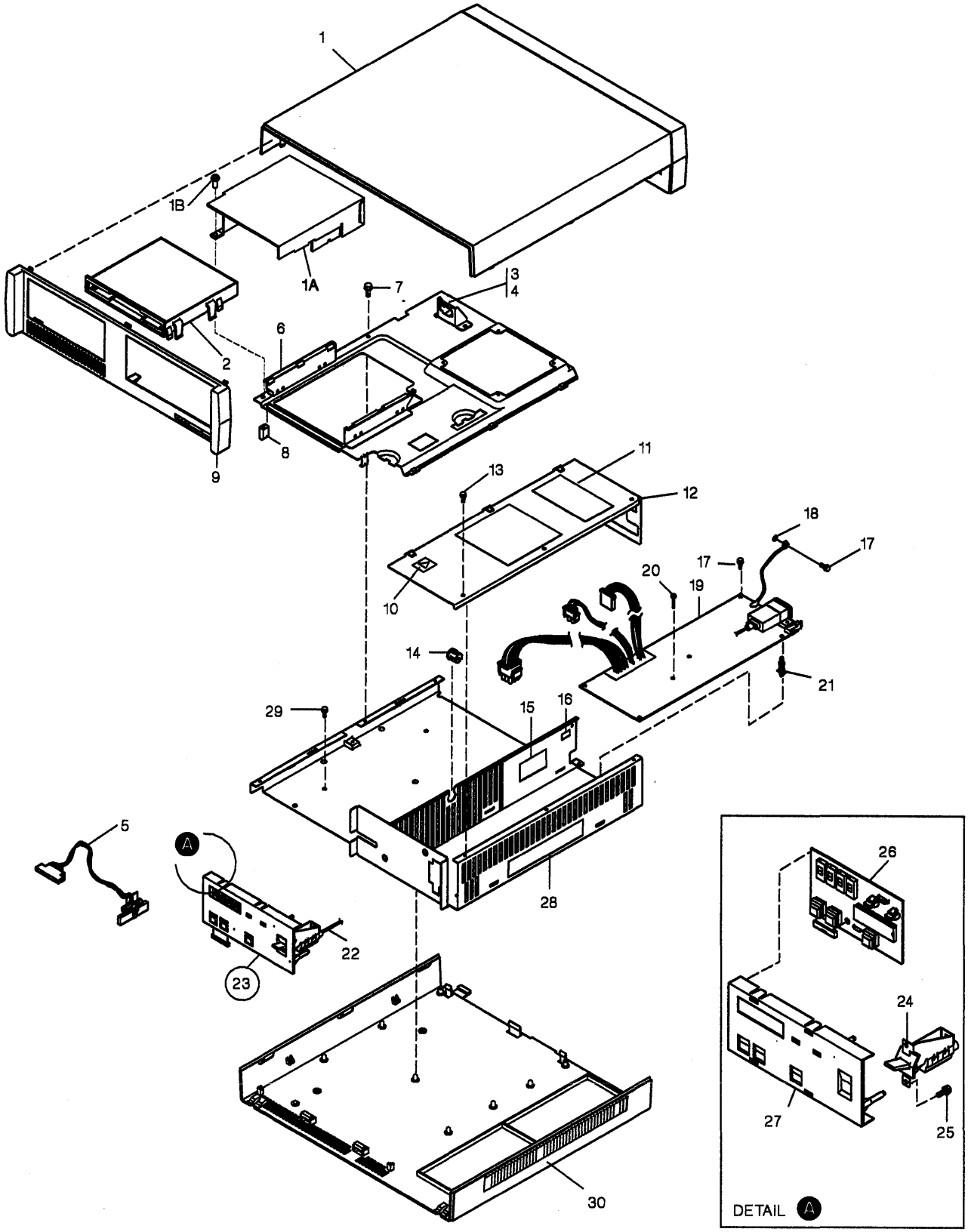


Asm – Index	Part Number	Units	Description
1 –		NP	Final Assembly- 3174
– 1	6168584	1	• Label,Hex
– 2	73X4030	1	• Nameplate-Model 81R
– 2	73X4031	1	• Nameplate-Model 82R
– 2	25F8530	1	• Nameplate-Model 91R
– 2	25F8381	1	• Nameplate-Model 92R
– 3	73X4016	1	• Label,Serial No.
– 3	73X4017	1	• Label,Serial No.
– 3	73X4018	1	• Label,Serial No.
– 3	73X4019	1	• Label,Serial No.
– 3	73X4020	1	• Label,Serial No.
– 3	73X4021	1	• Label,Serial No.
– 3	73X4022	1	• Label,Serial No.
– 3	73X4039	1	• Label,Serial No.
– 4	855285	1	• Plate,Import/Export- Used On Units Shipped To The UK
– 5	855284	1	• Plate,Mfg Export
– 5A	1359009	1	• Label,Mfg Export-Used On Units Shipped From The Netherlands
– 5B	5953429	1	• Label,PTT-Australia Only
– 5C	83X9765	1	• Label,Safety-Sweden Only
– 5D	65X2932	1	• Label,OBD-Japan Only
– 6	73X4032	1	• Label,Voltage-USA,Canada
– 6	73X4033	1	• Label,Voltage- 100V AFE
– 6	73X4034	1	• Label,Voltage- 200V AFE
– 6	73X4035	1	• Label,Voltage- 100V EMEA
– 6	73X4036	1	• Label,Voltage- 200V EMEA Order Labels Separate by Country
– 6A	83X9764	1	• Label,PTT-Germany Only
– 7	73X4013	1	• Label,Use Only Cable-English
– 7	5267922	1	• Label,Use Only Cable-Canada/French
– 7	5267924	1	• Label,Use Only Cable-Spanish
– 7	5267926	1	• Label,Use Only Cable-Portuguese
– 7	5267927	1	• Label,Use Only Cable-Japanese
– 7	5267925	1	• Label,Use Only Cable-Italian
– 7	5267923	1	• Label,Use Only Cable-German Order Labels Separate by Country
– 8	73X4013	1	• Label,BNC
– 9	73X3979	1	• Label,Used On Units Shipped To The UK
– 10	61X4618	1	• Diskette Drive Asm-1.2 Meg-Models 81R and 82R only
– 10	72X6058	1	• Diskette Drive Asm-2.4 Meg-Models 91R and 92R only
– 11	1621171	4	• Screw,Pan HD-M3 X 8 Long
– 11A	1622344	4	• Washer,Lock Star- 3.2 ID X 6 OD X .4T


A
5D
5
4
5A
5B
1
2
3
5C
6
6A
7
8
9
VIEW A
18A
12
10
11
11A
13
14
14A
15
20
19
18
21
SEE ASM. 2
DETAIL B
C
17
16
VIEW C

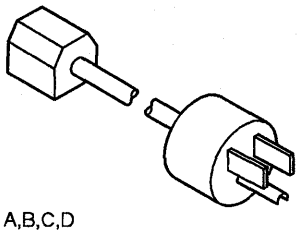
Asm – Index	Part Number	Units	Description
1 – 12	6168801	1	• Guard,Fan
– 13	83X9668	1	• Fan Asm-Old Style
– 13	25F7207	1	• Fan Asm-New Style
– 14	1621150	4	• Screw,Slot Pan HD-M3 X 35mm Long Used on Old Style Fan Asms
– 14	1621155	4	• Screw,Pan HD-M3 X 40 Long Used on New Style Fan Asms
– 14A	1622302	4	• Washer,Flat- 3.2 ID X 7 OD X .5 Thk
– 15	2596291	2	• Clip,Cable
– 16	1624877	2	• Screw,Pan HD-M4 X 20 Long
– 17	73X4060	2	• Clip,Nut
– 18	73X4023	1	• Overlay,Ops-English
– 18	73X4025	1	• Overlay,Ops-Canada/French
– 18	73X4029	1	• Overlay,Ops-Spanish
– 18	73X4024	1	• Overlay,Ops-Portuguese
– 18	73X4028	1	• Overlay,Ops-Japanese
– 18	73X4027	1	• Overlay,Ops-Italian
– 18	73X4026	1	• Overlay,Ops-German Order Ops Overlays Separate by Country
– 18A		1	• Memory Card,2 Meg-Models 91R and 92R Only
– 19		NP	• Planar Asm
– 20	1621832	2	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
– 21		NP	• Mechanical Subassembly For Detail Breakdown,See Asm 2

Assembly 2: Mechanical Subassembly

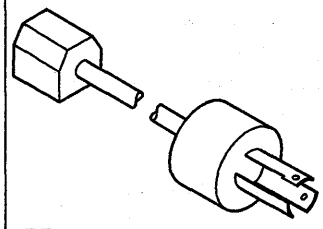


Asm– Index	Part Number	Units	Description
2–		NP	Mechanical Subassembly For Next Higher Assembly,See 1-21
–1	73X4045	1	• Cover,Top
–1A	25F7204	1	• Shield
–1B	1621832	3	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–2	73X4051	1	• Holder
–3	73X4042	1	• Bracket,Connection-Models 81R and 82R Only
–4	1621832	1	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–5	73X4068	1	• Cable Asm,Diskette-Models 81R and 82R
–5	25F7458	1	• Cable Asm,Diskette-Models 91R and 92R
–6	73X4044	1	• Plenum-Models 81R and 82R
–6	25F8329	1	• Plenum-Models 91R and 92R
–7	1621832	1	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–8	73X4052	1	• Spacer,Block
–9	73X4048	1	• Cover,Front
–10	73X4015	1	• Label,Voltage
–11	73X4014	1	• Label,Safety
–12	73X4043	1	• Cover,Power
–13	1621832	3	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–14	83X9651	1	• Grommet
–15	73X4142	1	• Label,Safety
–16	73X4700	1	• Label,Ground
–17	1621832	2	• Screw,Thd Form Hex Wshr HD-M4 X 5 Long
–18	1622346	1	• Washer,Lock Star- 4.3 ID X 8 OD X .5T
–19	39F6213	1	• Card Asm,Power 50/60 Hz 100V Replace Fuse on Card with SB/T 2.5A 125V WT Only
–19	39F6214	1	• Card Asm,Power 50/60 Hz 200V Replace Fuse on Card with SB/T 1.25A 250V WT Only
–20	1621173	1	• Screw,Pan HD-M3 X 12 Long
–21	83X9652	4	• Support
–22	73X3759	1	• Cable Asm,Actuator
–23	26F0093	1	• Panel Asm,Ops When Ordering Ops Panel,Order Overlay Separately By Country
–24	5606690	1	• • Lever-On/Off
–25	1622675	2	• • Screw,Self Tap Hex Wshr HD-M3.5 X 8 Long
–26	83X9500	1	• • Card Asm,Ops
–27	73X4049	1	• • Panel,Ops
–28	73X4041	1	• Chassis
–29	1622681	2	• Screw,Self Tap Hex Wshr HD- 48-2 X 10 Lg
–30	73X4045	1	• Cover,Base

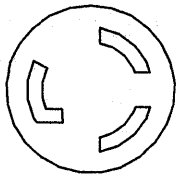
Assembly 3: Cable Assemblies With Component Parts



A,B,C,D



E,F



RECEPTACLE

Asm – Index	Part Number	Units	Description
3 – A	1838484	1	Attachment Cord,Power(10A/125V) 4.3m Unshielded-USA(Hospital Shield), See Figure A
– B	1838587	1	Attachment Cord,Power(10A/125V) 1.8m Unshielded-USA(Hospital Shield), See Figure B
– C	6952299	1	Attachment Cord,Power(10A/125V) 4.3m Unshielded-AFE/USA.EMEA, See Figure C
– D	6952301	1	Attachment Cord,Power(10A/125V) 1.8m Unshielded-USA,See Figure D
– E	7842140	1	Attachment Cord,Power(10A/125V) Twist Lock, 1.8m Unshielded-USA,See Figure E
– F	7842142	1	Attachment Cord,Power(10A/125V) Twist Lock, 1.8m Unshielded-USA/Canada,See Figure F
– G	39F7858	1	Cable Asm-External,X.21 - 6m
– G	6168156	1	Cable Asm-External,X.21 - 12m
– H	39F7858	1	Cable Asm-External,EIA - 6m
– H	6423154	1	Cable Asm-External,EIA - 12m
– J	25F8490	1	Cable Asm-External,V.35 - 6m,USA and WT
– J	25F8491	1	Cable Asm-External,V.35 - 6m France and Switzerland
– J	6423327	1	Cable Asm-External,V.35 - 12m,USA and WT

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1622344	1 – 11A	5-7
1622346	2 – 18	5-11
1622675	2 – 25	5-11
1622681	2 – 29	5-11
1624877	1 – 16	5-9
1838484	3 – A	5-12
1838587	3 – B	5-12
25F7204	2 – 1A	5-11
25F7207	1 – 13	5-9
25F7458	2 – 5	5-11
25F8329	2 – 6	5-11
25F8381	1 – 2	5-7
25F8490	3 – J	5-12
25F8491	3 – J	5-12
25F8530	1 – 2	5-7
2596291	1 – 15	5-9
26F0093	2 – 23	5-11
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39F6214	2 – 19	5-11
39F7858	3 – G	5-12
	3 – H	5-12
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5267924	1 – 7	5-7
5267925	1 – 7	5-7
5267926	1 – 7	5-7
5267927	1 – 7	5-7
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5953429	1 – 5B	5-7
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73X3979	1 – 9	5-7
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	1 – 8	5-7
73X4014	2 – 11	5-11
73X4015	2 – 10	5-11
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73X4017	1 – 3	5-7
73X4018	1 – 3	5-7
73X4019	1 – 3	5-7
73X4020	1 – 3	5-7
73X4021	1 – 3	5-7
73X4022	1 – 3	5-7
73X4023	1 – 18	5-9
73X4024	1 – 18	5-9
73X4025	1 – 18	5-9
73X4026	1 – 18	5-9
73X4027	1 – 18	5-9
73X4028	1 – 18	5-9
73X4029	1 – 18	5-9
73X4030	1 – 2	5-7
73X4031	1 – 2	5-7
73X4032	1 – 6	5-7
73X4033	1 – 6	5-7
73X4034	1 – 6	5-7
73X4035	1 – 6	5-7
73X4036	1 – 6	5-7
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Appendix A. IBM Cabling System

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3299 Model Interchangeability A-4
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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 to the *IBM Cabling System Planning and Installation Guide*, GA27-3361.

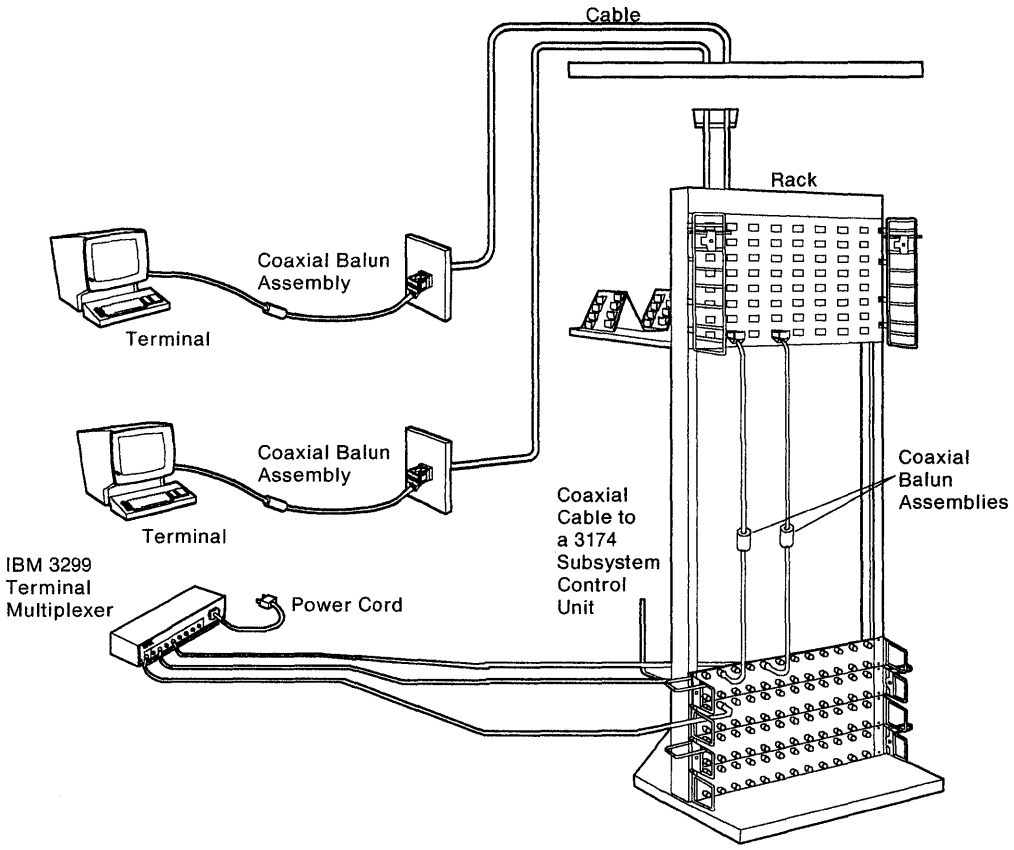


Figure A-1. IBM Cabling System

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.

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	30 – 274 Meters (100 – 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 accept coaxial cable and IBM Cabling System Type 1 and Type 2 cables.

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 (type 3 specified) 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 resides 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 IBM Cabling System wiring type 3 specified cable (telephone twisted pair). The eight output ports on the Model 3 are RJ11 type connectors which accept only telephone type-twisted pair (TTP). The connection to the 3174 is through coaxial cable or 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 cable is supported from the 3299 Model 3 to a terminal. Flat telephone wire and stubs (wires that are not terminated) are not supported.

3299 Model Interchangeability

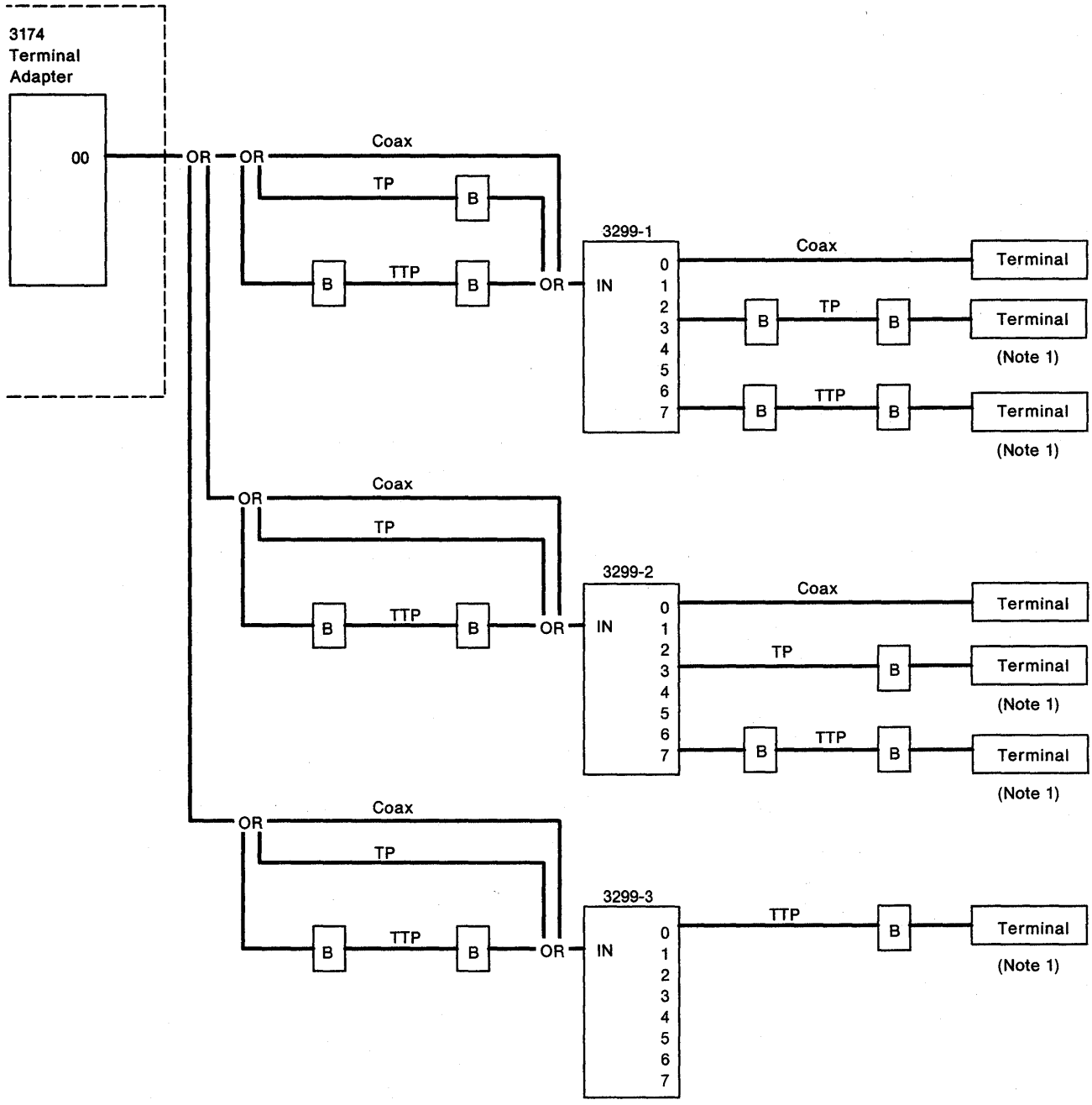
The 3299 is a service exchange center product. Fault isolation and resolution are customer responsibilities. To improve availability it is recommended to the customer that a minimum number of spare 3299s should be purchased, depending on the number of 3299s installed. When a customer is exchanging 3299s 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 only be replaced 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

Note: 1 Terminals with the new dual-purpose connector (DPC) have drive receivers that do not require the use of baluns.

Figure A-2. 3299 Cabling

Device Signal Cable Connectors

With the availability of different types of cable media and cable media connectors, it is important to identify which type of connectors are being used.

Older 3270 products, such as Model 1 3299s use a standard BNC jack and accept standard BNC connectors that are used with coaxial cabling or the coax-to-twisted-pair balun. Later 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 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 5 millimeters (3/16 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.

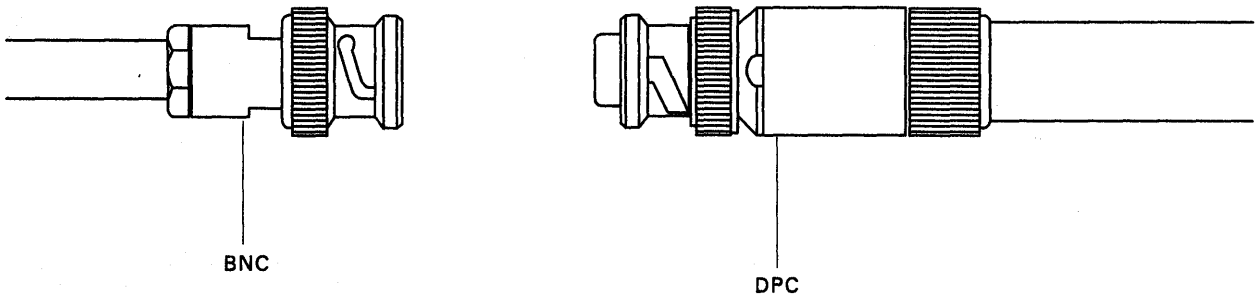


Figure A-3. BNC and DPC Connectors

Appendix B. X.25 Feature

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X.25 Feature

The Type 1 Communication and Concurrent Communication Adapter in the 3174 Establishment Controller enable 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,* GA23-0204.

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 48 000 bps for 3174 Models 81R and 91R

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 the 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 to match the user's subscription. The optional information is based on the options selected while configuring the 3174 or on 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 via 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 via 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 via 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 Request packet.

Restart Request (PVC/SVC)

The Restart Request packet is sent when the 3274 is closing the link because it has detected 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:

- A 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 attached display station's problem determination guide.

Key Functions

- Extension Key
- DISC (disconnect) key
- COMM (communication) key
- DIAL key
- LOCAL key
- LOAD MATRIX 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 C-4 for details.

Indicators

The following indicators are displayed in the Reminder Area of the operator information area of the display screen:

- Call Ready
- Dial In (other terminals, same controller)
- Incoming Call in progress
- Local (Z 599)
- Dial In (dialing terminal)
- Outgoing Call in progress
- 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, goes 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-20 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.

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, dial mode is reset, 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	—z_ # ?	Accepted. Display Dial screen with saved parameters	✖人—z_ or —z_ ##	Rejected.
LOCAL key	↖z_ 599	Accepted. (See Note.)	✖人—z_ or —z_ ##	Rejected.
COMM key	—z_ # ?	Ignored.	—z_ ##	Ignored.
DISC key	—z_	Accepted. (See Note.)	—z_	Accepted. (See Note)
TEST key	TEST	Accepted. Abort Dial In.	TEST or —z_ ##	Accepted.
ENTER key	—+z_ (if ok) ✖人 # ? or —+z_ (if not ok)	Validate input. If OK, accept ENTER key, update parameters, initiate out-going call. (See Note.)	✖—f or —z_ ##	Rejected.
CLEAR key	—z_ # ?	Accepted. Restore Dial-In.	—z_ ##	Accepted. Clear screen.
PA,PF, ATTN, SYS REQ keys	✖—f or —z_ #?	Rejected.	✖—f or —z_ ##	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 via 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, or 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*.

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 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 [3]
Call Ready	Accepted. 599	Rejected.	Ignored.
Call Ready with C&D Codes	Accepted. 599	Rejected. XCCDD	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

	Operation								
Status	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, ' , . ^

	Operation			
Status	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 ⁻z_## ?or⁻z_##	Accepted.[5] ⁻z_#?or⁻z_##
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.

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.

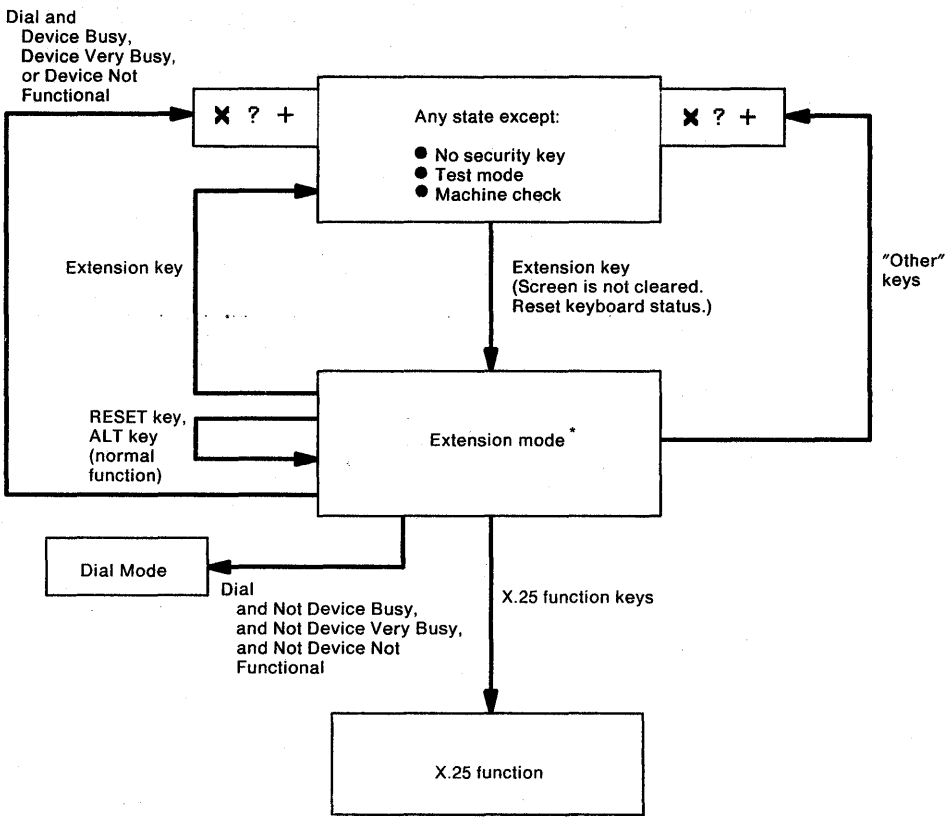
Extension Key

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.



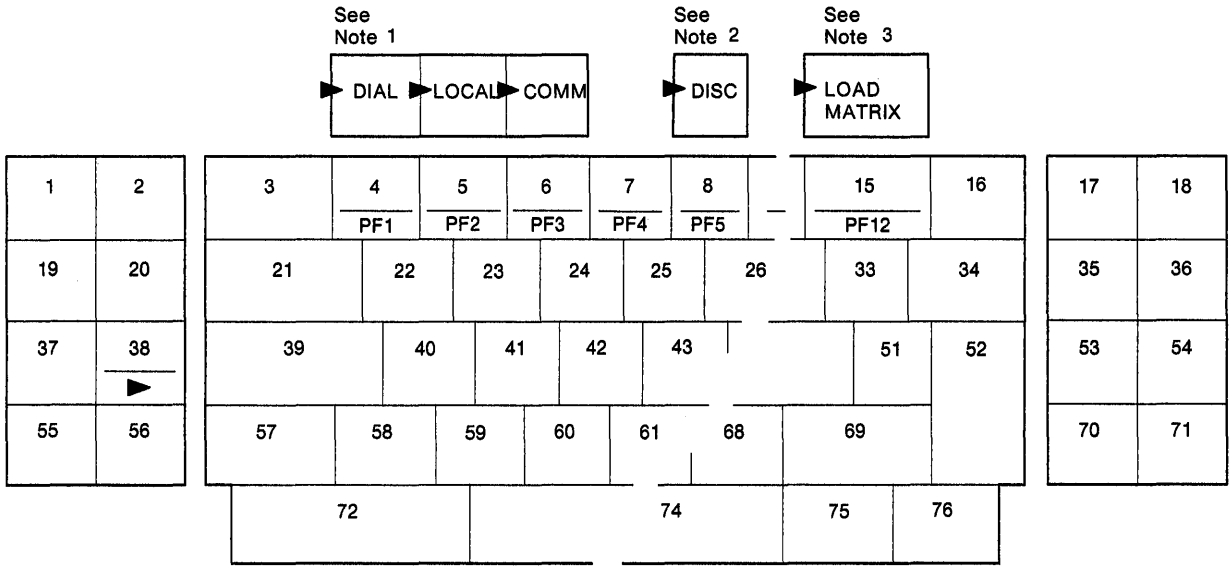
Indicate '►' in the shift status field of the operator information area.

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@
```

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.

Figure B-5. Dial Mode Screen

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 via 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-26.

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 via 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 pressed, 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 always to 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 be displayed for only a split second and not be seen by the operator) and try 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.

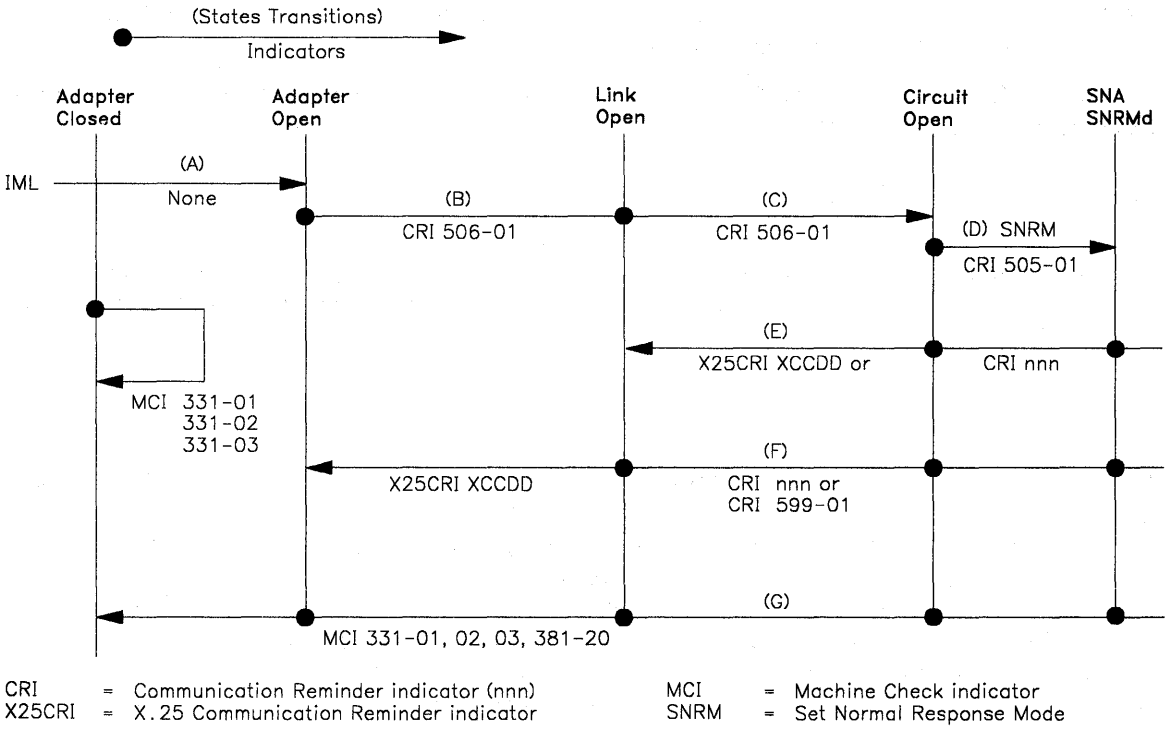


Figure B-6. PVC States and Indicators

Switched Virtual Circuit

Figure B-7 provides a summary of SVC states and indicators.

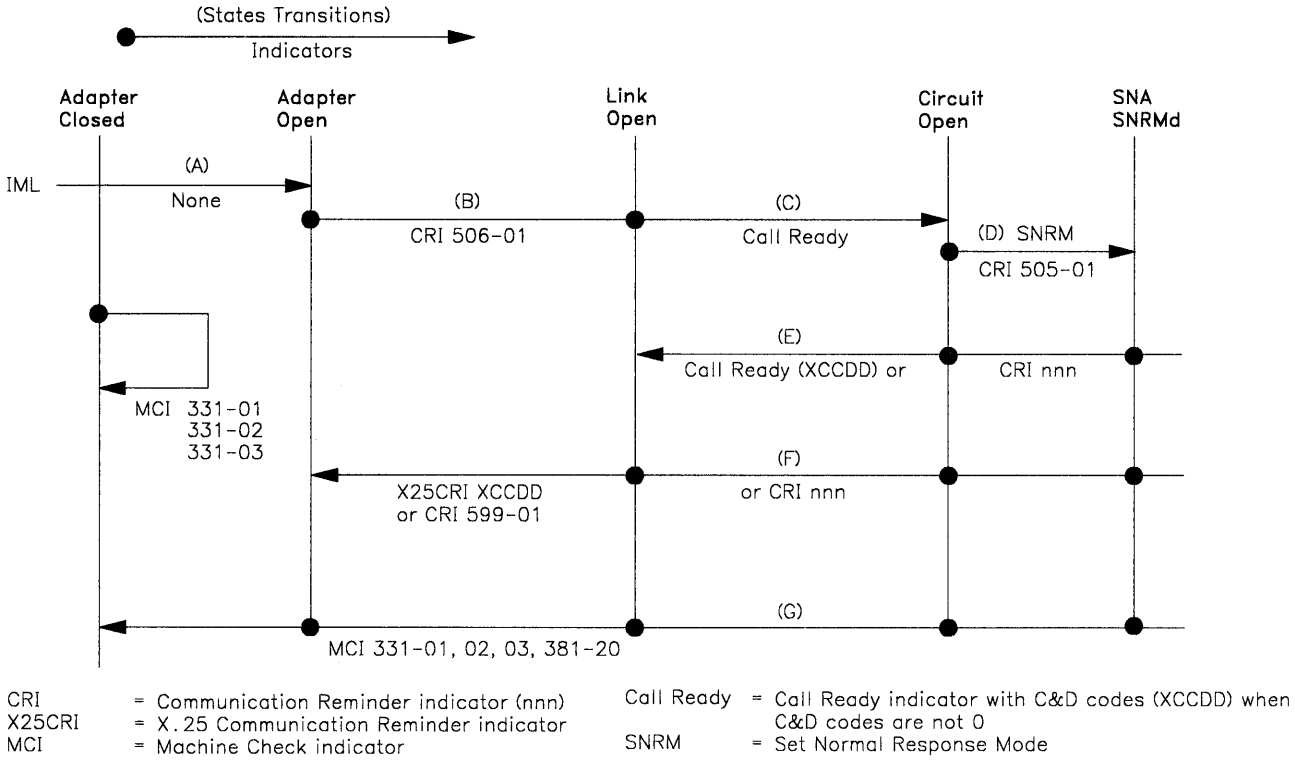


Figure B-7. SVC States and Indicators

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 a DCE (Clear Packet)

Hex Code	Meaning
00	DTE-originated[1]
01	Number busy
09	Out of order
11	Remote procedure error
19	Reverse-charging acceptance not subscribed
21	Incompatible destination
29	Fast-select acceptance not subscribed
03	Invalid facility request
0B	Access barred
13	Local procedure error
05	Network congestion
0D	Not obtainable
15	RPOA out of order

[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-29 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 a DCE (Reset Packet)

Hex Code	Meaning
00	DTE-originated[1]
01	Out of order[2]
03	Remote procedure error
05	Local procedure error
07	Network congestion
09	Remote DTE operational[2]
0F	Network Operational[2]
11	Incompatible destination

[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-29, 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 a DCE

Hex Code	Meaning
00	No additional information
01	Invalid P(S)
02	Invalid P(R)
10	Packet type invalid — general
11	For state: 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
11	For state: 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
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

Table B-7 (Page 2 of 2). Diagnostic Code Fields Generated by IBM (SNA) DTE

Hex Code	Meaning
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 to 0
E3	Incoming call received on wrong LC
E4	Facility not subscribed
E5	Invalid packet for LC equal to 0
E6	Facility parameters not supported
E7	Facility not supported
E8	Unexpected calling DTE
E9	Invalid D bit received
EA	Reset indication on virtual call
EB	Invalid protocol identifier
EC	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

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21 Feature

The Type 2 Communication and Concurrent Communication Adapter in the 3174 Establishment Controller enable 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.

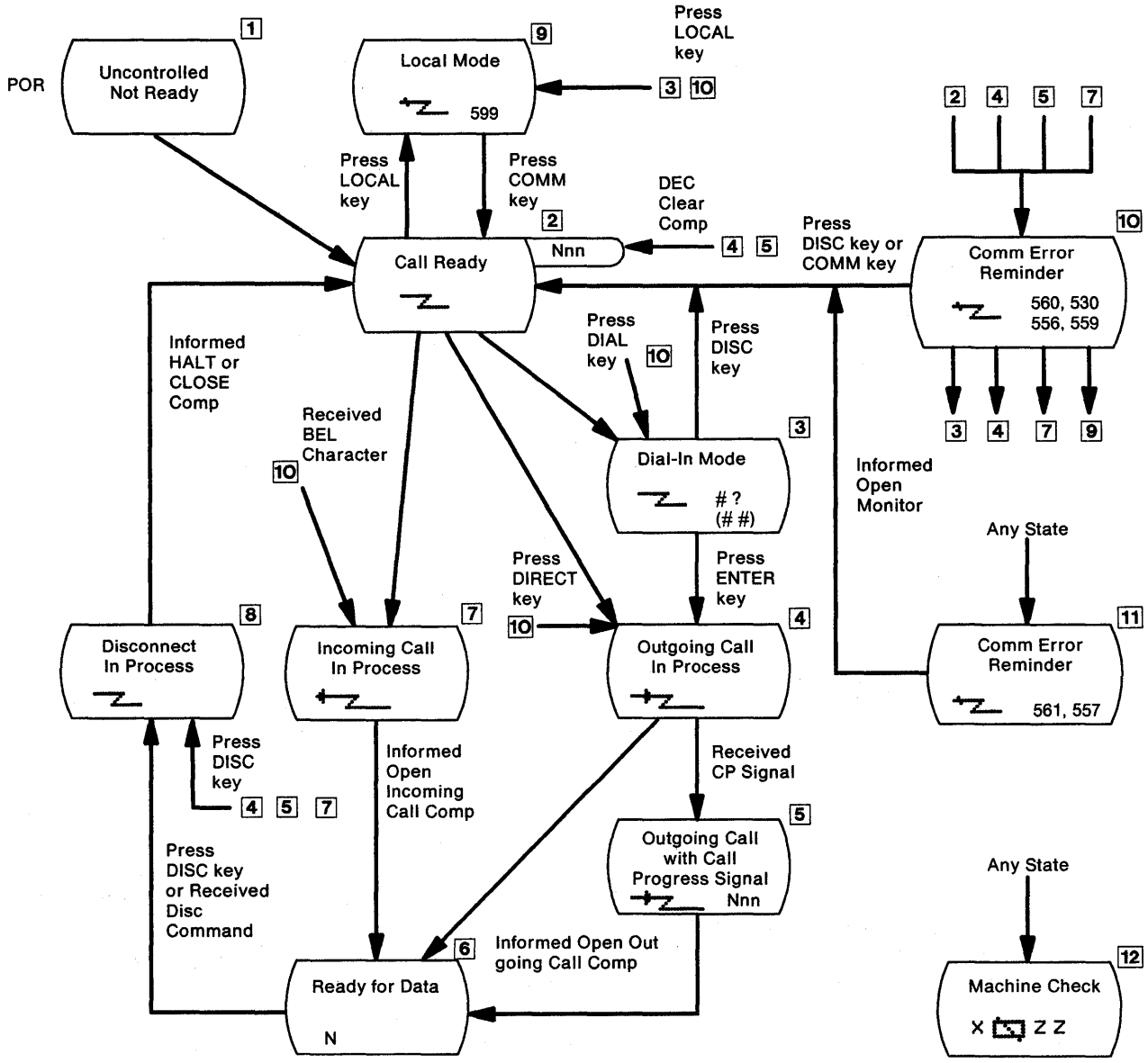

Figure C-1. Data Link Control Function

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 and, after passing through the ready state, 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, or 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 (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, however, 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-4, 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. The data link control 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-9 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.

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_ # ?	✖ 大 —z_ —z_ # #
DIRECT	→z_	✖ 大 —z_ —z_ # #
LOCAL	↖z_ 599	✖ 大 —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 nor "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" to be signaled (manual answer).
	6	The T4 (2-second) timer has occurred during an incoming call when "ready for data" is not detected after the microcode has signalled 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.

A/N. Alphanumeric.

APL. A Programming Language.

ASCII. American National Standard Code for Information Interchange.

ATTN. Attention.

B

B. Busy.

bps. Bits per second.

BSC. Binary synchronous communication.

C

C. Celsius.

C&D. Cause and diagnostic (codes).

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

CHIO. Channel input output.

CID. Connection identifier.

coax. Coaxial (cable).

comm. Communication.

cont. Continuous.

cps. Characters per second.

CRT. Cathode-ray tube.

CSCM. Central Site Change Management.

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.

dBa. Adjusted decibels.

DC. Direct current.

DCE. Data-circuit-terminating equipment.

DE. Device-end.

DES. Data Encryption Standard.

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.

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.

EIA. Electronic Industries Association.

ERP. Error recovery procedures.

ESC. Escape.

F

F. Fahrenheit.

FCC. Federal Communications Commission.

FCS. Frame checking sequence.

FF. Forms feed.

FM. (1) Frequency modulation. (2) Function management. (3) Field mark.

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

H. Height.

hex. Hexadecimal.

HNAD. Host network (DTE) address.

HPCA. High-performance communication adapter.

I

I. Information (format).

ID. Identification, identifier.

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.

L

L. Left.

LAPB. Link access procedure balanced.

LC. Logical channel.

LCID. Logical channel identifier.

LED. Light-emitting diode.

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.

MB. Optical fiber mounting bracket.

MDT. Modified data tag.

MHS. Magnetic hand scanner.

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.

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

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.

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.

U

U. Unprotected.

UA. Unnumbered acknowledgment.

U.S. United States.

V

V. Volt.

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.

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.

asynchronous. (1) Without regular time relationship; unexpected or unpredictable with respect to the execution of program instructions. (2) In asynchronous data transmissions, data characters may be sent or received at any time; no modem clocking is used to establish bit timing.

Asynchronous Emulation Adapter (AEA). In the 3174 Establishment Controller, an adapter that enables an ASCII terminal to communicate with a 3270 host using the 3270 data stream, an ASCII terminal to communicate with an ASCII host through the 3174, and a 3270 terminal to communicate with an ASCII host using the DEC VT100 data stream or the IBM 3101 data stream.

attach. To connect a device logically to a 3174 adapter, so that it can communicate over the network.

attachment feature. The circuitry by which a cable from a local terminal or a modem for a remote terminal is attached to a 3792 Auxiliary Control Unit or a 3791 Controller.

attention (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.

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.

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.

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*.

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.*

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

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.

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.

duplex. Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full duplex*.

E

EIA communication adapter. A communication adapter conforming to EIA standards that can combine and send information on two lines at speeds up to 19.2 kbps.

EIA 232D. An electrical interface defined by the Electronics Industries Association for establishing connections and controlling data flow between data terminal equipment and data communication equipment. The interface has been adapted to allow communication between DTEs.

emulation. (1) The imitation of all or part of one system by another, primarily by hardware, so that the imitating system accepts the same data, executes the same programs, and achieves the same results as the imitated computer system. (2) The use of programming techniques and special machine features to permit a computing system to execute programs written for another system. (3) Imitation; for example, imitation of a computer or device. (4) See *terminal emulation*. (5) Contrast with *simulation*.

encrypt. To scramble data or convert it, before transmission, to a secret code that masks the meaning of the data to any unauthorized recipient. Contrast with *decrypt*.

event. (1) An occurrence or happening. (2) An occurrence of significance to a task; for example the completion of an asynchronous operation, such as an input/output operation.

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*.

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

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

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

host system. (1) A data processing system used to prepare programs and operating environments for use on another computer or controller. (2) The data processing system to which a network is connected and with which the system can communicate. (3) The controlling or highest-level system in a data communication configuration; for example, a System/38 is the host system for the work stations connected to it.

I

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

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.

K

keyboard definition. A customizing procedure for defining a maximum of four modified keyboard layouts for modifiable keyboards only. Most characters, symbols, and functions can be relocated, duplicated, or deleted from almost any keyboard position.

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.

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.

N

native mode. A 3179 or 3180 operational mode that uses the full capabilities of those models' display and keyboard.

NetView. A comprehensive network management product that is the basis for central control of both systems for network operations. It supersedes NCCF, NPDA, NLDM, and NPM.

network. (1) An arrangement of nodes and connecting branches. Connections are made between data stations. (2) A configuration of data processing devices and software connected for information interchange.

Network Control Program (NCP) node. In SNA products, a subarea node that contains an ACF/NCP program but not a system services control point (SSCP).

node. An end point of a link or a junction common to two or more links in a network.

nonswitched line. (1) A connection between systems or devices that does not have to be made by dialing. Contrast with *switched line*. (2) A telecommunication line on which connections do not have to be established by dialing. Synonymous with *leased line*.

O

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.

ohm. The practical meter-kilogram-second unit of electric resistance equal to the resistance of a circuit in which a potential difference of 1 volt produces a current of 1 ampere.

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.

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.

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 handler. Programming in an adapter that encodes and decodes the protocol used to format signals sent along a network.

R

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.

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*.

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 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.

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.

Token-Ring Network. (1) A ring network that allows unidirectional data transmission between data stations by a token-passing procedure over one transmission medium so that the transmitted data returns to the transmitting station. (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

type. In the 3174 Establishment Controller, the identifying number of a card. For example, 9150 is the type number of the terminal adapter in the 3174.

type-1 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using any of these interfaces: (a) EIA 232D/V.24 and V.35 for SNA/SDLC, (b) BSC, and (c) X.25. The user selects the appropriate interface.

type-2 communication adapter. The 3174 adapter that supports communication between the 3174 (and its terminals) and a host over telecommunication links using either the X.21 interface for SNA/SDLC or the X.25 interface. The user selects the interface.

U

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.

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Models 81R, 82R, 91R, and 92R
Maintenance Information

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