

3174 Establishment Controller

Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R
Maintenance Information



3174 Establishment Controller

SY27-0323-05

**Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R
Maintenance Information**

3174 Licensed Internal Code

Licensed Internal Code remains the property of IBM and is to be used only in accordance with the Agreement for Purchase of IBM Machines or the Agreement for Lease or Rental of IBM Machines, whichever Agreement is applicable.

In this document, the term **3174 Microcode** refers to Licensed Internal Code.

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page xvii.

Sixth Edition (June 1994)

- | This edition applies to 3174 Configuration Support A and S Release 5, Configuration Support B Release 4, Configuration Support C Release 5, and subsequent releases and modifications until otherwise indicated in new editions.
- | Order publications through your IBM representative or the IBM branch office serving your locality. Publications are not stocked at the address given below.
- | A form for reader's comments appears at the front and at the back of this publication. If the forms have been removed, address your comments to:
 - | Department E02
 - | Design and Information Development
 - | IBM Corporation,
 - | PO Box 12195
 - | RESEARCH TRIANGLE PARK, NC 27709-9990.
 - | USA
- | In the USA, you may also use our toll-free FAX number, 1-800-253-3520, to send us your comments.

When you send information to IBM, you grant IBM a non-exclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© Copyright International Business Machines Corporation 1990, 1994. All rights reserved.

Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

TELL US WHAT YOU THINK!

We hope you find this publication useful, readable, and technically accurate, but only you can tell us!

Your comments and suggestions will help us improve our technical publications.

Please take a few minutes to let us know what you think by completing this form.

If you are in the U.S.A., you may mail this form postage free or FAX it to us at 1-800-253-3520. (Elsewhere, your local IBM branch office or representative will forward your comments or you may mail directly to the address below.)

Fold and Tape

Please do not staple

Fold and Tape



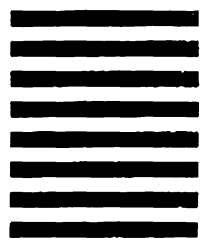
NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Department E02
Design & Information Development
International Business Machines Corporation
P O BOX 12195
RESEARCH TRIANGLE PARK NC 27709-9990



Fold and Tape

Please do not staple

Fold and Tape

FAX or MAIL 1-(800)-253-3520

TELL US

3174 Establishment Controller
Modles 21H, 21L, 21R, 22L, 22R,23R, and 24R
Maintenance Information
SY27-0323-05

Specific Problems and Comments:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Overall, I am satisfied with this publication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The information in this publication is technically accurate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The procedures in this publication are easy to follow.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This publication contains all the information I need.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific items of information are easy to find.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The figures and tables are easy to understand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The examples are helpful and useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The layout and format are attractive and useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What do you like most about this publication? _____

How can this publication be improved? _____

What similar publications, if any, do you think are better than this publication? (IBM or other) _____

For a Reply, Complete the Following—

Name _____ Company _____
Occupation _____ Address _____
Phone _____
FAX _____

Thank you for your response. When you send information to IBM, you grant IBM the right to use or distribute the information without incurring any obligation to you. You of course retain the right to use the information in any way you choose.



FAX or MAIL 1-(800)-253-3520

Translated Safety Notices

U.S. English	You can find translated safety notices in the multilingual safety notice book, GA27-3824.
Belgian Dutch	De vertaalde veiligheidsinstructies vindt u in het meertalige boekje GA27-3824.
Brazilian Portuguese	Voce encontrará notas de segurança traduzidas no manual multilíngüe de notas de segurança, código GA27-3824.
Canadian French	Vous trouverez les consignes de sécurité en français dans le manuel multilingue GA27-3824.
Danish	Oversatte sikkerhedsbestemmelser kan findes i den flersprogede sikkerhedsbog, GA27-3824.
Finnish	Turvaohjeet ovat myös suomeksi monikielisessä julkaisussa, GA27-3824.
French	Vous trouverez les consignes de sécurité traduites dans la brochure multilingue <i>Safety Notice Book</i> , GA27-3824.
German	Übersetzte Sicherheitshinweise sind dem mehrsprachigen <i>Safety Notice Book</i> , GA27-3824, zu entnehmen.
Italian	Le informazioni di sicurezza tradotte si trovano nel manuale, GA27-3824.
Japanese	日本語の「安全に関するご案内」は各国語に翻訳された安全に関する記述を一冊にまとめた にありますのでご参照ください。 GA27-3824.
Korean	다국어 안전 정보 서적(GA27-3824)에서 번역된 안전 정보를 찾아 볼 수 있습니다.
Norwegian	Du finner oversatte sikkerhetsmeldinger i den flerspråklige sikkerhetsboken GA27-3824.
Portuguese	As informações de segurança traduzidas estão incluídas no manual de indicações de segurança GA27-3824 (multilíngüe).
Spanish	Puede hallar la información sobre seguridad traducida en el manual multilingüe correspondiente, GA27-3824.
Swedish	Svenska översättningar av de varningstexter som riktar sig till användaren finns i det flerspråkiga dokumentet med nummer GA27-3824.
Swiss French	Vous trouverez la traduction des instructions de sécurité dans le manuel des instructions de sécurité polyglotte, GA27-3824.
Swiss German	Sie finden die übersetzten Sicherheitsinformationen im mehrsprachigen Sicherheits-Informationen-Buch GA27-3824.
Swiss Italian	Lei trova gli informazioni di sicurezza tradotte nel <i>Safety Notice Book</i> plurilingue, GA27-3824.

Contents

Translated Safety Notices	iii
Notices	xvii
Trademarks	xvii
About This Book	xix
Who Should Use This Book	xix
How This Book Is Organized	xx
Choosing the Right Book from the 3174 Library	xxi
Other Related Publications	xxiii
What Has Changed in This Edition	xxiv
Sixth Edition (June 1994)	xxiv
Chapter 1. General Information	1-1
Introduction	1-3
Service Strategy	1-4
3174 Hardware	1-5
Base Hardware	1-5
3174 Feature Descriptions	1-7
Terminal Adapter (HG 26)	1-7
Terminal Adapter (HG 26 and HG 27)	1-7
Telephone Twisted-Pair TMA Feature	1-8
3299 Model 32 Terminal Attachment	1-11
Asynchronous Emulation Adapter	1-12
Gateway Function	1-13
Multi-Host Support	1-18
Concurrent Communication Adapter	1-18
Single Link Multi-Host Support	1-19
3174 Data Flow	1-19
Hardware Group and Type Numbers	1-21
3174 FRU Descriptions and Functions	1-21
Field Replaceable Unit Identification (FRU ID)	1-25
Status Codes	1-26
Status Code Display Format	1-26
How to Interpret the Status Codes Listing	1-26
Operational Status Code Operator Panel Presentation	1-27
Offline Test Status Code Presentation	1-29
3174 Event Log	1-31
Diskettes	1-36
Operator Panel	1-37
Indicators	1-37
Keypad	1-38
Function Push Buttons	1-38
Channel Interface Switch (Model 21L only)	1-38
AC Power Switch	1-39
DC Power Indicator	1-39
Central Site Change Management	1-39
3174 IML Selections for CSCM	1-40
Normal Initial Microcode Load (IML)	1-41
Alt 1 Normal IML Description	1-41

Alt 2 IML Procedures (Test 82)	1-43
Procedure A – Test 82	1-43
Procedure B – Test 82	1-44
Environmental Restrictions	1-44
Special Tools	1-45
Chapter 2. Diagnostic Information	2-1
Introduction	2-3
Start MAPs	2-3
MAP 0100: Check Cond Indicator Is On with Blank Status Indicators	2-5
MAP 0110: Operator Panel Isolation	2-7
MAP 0120: Status Code Not Indicated or Known	2-9
MAP 0200: 3270-Type Terminal Problem Entry	2-10
MAP 0210: All 3270-Type Terminals are Failing	2-11
MAP 0220: One or More Failing 3270-Type Terminals	2-16
MAP 0230: 3299 Model 32 and the Fiber Optic Terminal Adapter	2-20
MAP 0300: Telecommunication Failures	2-26
MAP 0420: Status Code 8888 Displayed	2-30
MAP 0430: File Adapter or Drive Failures	2-32
MAP 0500: IML Stops at 8888	2-34
MAP 0600: MMIO Bus Failure	2-35
MAP 0610: Token-Ring Failures	2-36
MAP 0620: ISDN Failures	2-39
MAP 0630: Ethernet Failures	2-45
MAP 0710: Power Load Isolation	2-47
MAP 0800: FRU ID Bus Isolation	2-49
MAP 0900: Channel Problems	2-51
MAP 0910: Online/Offline Channel Problem (Model 21L)	2-52
MAP 0920: Local Channel 3174 Isolation	2-54
MAP 0930: Enterprise Systems Connection Adapter Problems	2-58
MAP 1000: ASCII Problem Entry	2-60
MAP 1010: All ASCII Ports Are Failing	2-64
MAP 1020: Direct Attached Ports—Any Failure	2-66
MAP 1030: Leased Line (nonswitched) Port—Any Failure	2-73
MAP 1040: Switched Line Port—Any Failure	2-80
MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host	2-94
Diagnostic Aids: Offline Tests	2-96
Hardware Group Test Alls and Processor/Storage Tests	2-96
Hardware Group Basic Tests	2-97
Hardware Group Optional Tests	2-98
Test Request Format	2-98
How to Load the Test Monitor	2-102
Terminal Control Test Menus	2-103
How to Run Hardware Group Test Alls or Processor/Storage Test	2-105
How to Run Hardware Group Basic Tests	2-106
How to Run Diskette Drive Optional Tests	2-108
How to Run Fixed Disk Drive Optional Tests	2-110
How to Read and Set the Timer	2-115
How to Run the Operator Panel Test	2-116
How to Run Communication Adapter Optional Tests	2-117
How to Run the Channel Driver/Receiver Wrap Test (FN 01)	2-123
How to Run the Channel Online, Offline Switch Indicator Test (FN 02)	2-128
How to Run Enterprise Systems Connection Adapter Tests	2-128
How to Run Asynchronous Emulation Adapter Optional Tests	2-130

How to Run Terminal Adapter/TMA/FTA/3299 Optional Tests	2-139
How to Run Token-Ring Adapter Optional Tests	2-142
How to Run ISDN Adapter Optional Tests	2-145
How to Run Ethernet Adapter Optional Tests	2-149
How to Display the Test Log	2-150
How to Display the Test Monitor Functions (Terminal Control)	2-152
Online Tests—Configuration B and C	2-154
Running Configuration B/C Online Tests	2-163
3174 Test Menu—Configuration B/C	2-163
Test 0 Configuration B/C: Terminal Check	2-165
Test 1 Configuration B/C: Display Logs Menu	2-166
Test 2 Configuration B/C: Configuration Menu	2-172
Test 3 Configuration B/C: 3270 Device Status Information	2-175
Test 4 Configuration B/C: Reset Logs and Cable Errors	2-185
Test 5 Configuration B/C: Display Vital Data	2-187
Test 6 Configuration B/C: Display Control Areas	2-198
Test 7 Configuration B/C: Color Convergence	2-213
Test 8 Configuration B/C: Extended Functions and Programmed Symbols	2-213
Test 9 Configuration B/C: Token-Ring and LAN Tests	2-213
Test 10 Configuration B/C: Port Wrap Tests	2-235
Test 11 Configuration B/C: Trace Control	2-236
Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests	2-237
Test A Configuration B/C: Operator-Originated Alerts	2-246
Test D Configuration B/C: Distributed Function Terminal Dump	2-247
Test 13 Configuration B/C: ESCON Adapter Tests	2-248
Test 14 Configuration B/C: 3174 Operator Functions	2-253
Test 15 Configuration B/C: 3270 Host Status Summary	2-256
Test 16 Configuration C (Only): ISDN Adapter Tests	2-258
Test 17 Configuration C (Only): Advanced Peer-to-Peer Networking (APPN) Tests	2-268
Test 18 Configuration C (Only): Frame Relay Tests	2-279
General Procedures	2-288
How to Perform an Operator Panel Lamp Test	2-288
How to Display the Master Menu	2-288
Taking the 3174 Offline	2-290
How to Take the 3174 Model 21L Offline	2-290
How to Place the 3174 Model 21L Online	2-290
How to Force the 3174 Model 21L Offline: Alt 1 Method	2-291
How to Take the 3174 Model 22L Offline	2-291
How to Place the 3174 Model 22L Online	2-291
How to Disconnect the Bus and Tag Cables	2-292
How to Switch the Power On at the 3174 Model 21L	2-292
How to Switch the Power Off at the 3174 Model 21L	2-292
How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)	2-292
How to Perform the Coaxial Cable Ground Loop Check	2-293
Measuring the 3174 Enterprise Systems Connection Adapter Transmit and Receive Levels	2-295
Modem Specifications and Switch Settings	2-297
How to Use the 3174 Patch Procedure	2-301
How to Perform the 3174 Dump Procedure	2-310
Status Codes for Manual Dump	2-311
How to Analyze Dump Completion Codes	2-312
Dump Status Codes Using Test 14	2-314
3174 Display Subsystem S/370 OLTs	2-317
Model 21L (SNA) 3174B OLTs	2-317
Model 21L (Non-SNA) 3174A OLTs	2-319

Model 21R OLTs	2-322
Chapter 3. Repair Information	3-1
Component Locations	3-2
Type and Hardware Group Numbers	3-4
Interrupt Levels	3-5
ISDN Adapter Cabling	3-6
Removal/Replacement Procedures	3-7
Feature Card Removal/Replacement	3-7
Storage Card Removal/Replacement	3-10
Power Supply Removal/Replacement	3-11
Planar Board Removal/Replacement	3-12
Operator Panel Removal/Replacement	3-14
Fan Removal/Replacement	3-14
Diskette Drive Removal/Replacement	3-16
Fixed Disk Drive Removal/Replacement	3-17
Bus/Tag Tailgate Assembly Removal/Replacement	3-18
Logic Board Removal/Replacement	3-19
Installing the logic board	3-21
Chapter 4. Connecting a Model 21L to a Host Channel	4-1
Introduction	4-2
Installation Procedure	4-2
Controller Channel Priority	4-2
Priority Switches	4-2
UCW Settings	4-4
Connecting Bus/Tag Channel Cables	4-5
Channel Attachment Information	4-8
Chapter 5. Safety Inspection Guide	5-1
Introduction	5-2
Preparation	5-2
General Checklist Guidelines	5-2
Chapter 6. Parts Catalog	6-1
Appendix A. 3299 Terminal Multiplexer Reference Information	A-1
3299 Model 1	A-2
3299 Model 1X4	A-2
3299 Model 2	A-2
3299 Model 3	A-2
3299 Model 32	A-3
3299 Model 32T	A-3
3299 Model Interchangeability	A-4
3299 Cabling	A-4
Dual Purpose Connectors (DPC)	A-4
Maximum 3299 Attachment Cable Lengths	A-4
Appendix B. X.25 Feature	B-1
X.25 Feature	B-2
Timers	B-3
X.25 Network	B-3
Virtual Circuits	B-3
Logical Channels	B-3

Packet Types	B-4
X.25 Key Functions	B-6
Indicators	B-7
X.25 States	B-8
Call Ready (SVC only)	B-8
Data Ready	B-9
Disconnect in Progress	B-9
Incoming Call	B-10
Local Mode	B-10
Exception Case Handling	B-10
X.25 SVC States and Key Operation	B-11
Dial Mode Screen	B-14
Switched Virtual Circuit (SVC)	B-16
Autocall and Autodisconnect	B-16
Permanent Virtual Circuit (PVC)	B-16
PVC Keys	B-16
LOCAL Key	B-16
COMM Key	B-16
Summary of States and Indicators	B-17
Permanent Virtual Circuit	B-17
Switched Virtual Circuit	B-18
Appendix C. X.21 Feature	C-1
Introduction	C-2
X.21 Functional Description	C-2
X.21 Switched Microcode Function	C-4
Data Link Control Function	C-5
Status and Key Operation	C-7
Glossary of Terms and Abbreviations	X-1
Index	X-31

Figures

1-1.	3174 Service Strategy	1-4
1-2.	Example of 3174 Terminal Attachment	1-7
1-3.	Optional Planar Board Containing the 3270 Port Expansion Feature	1-8
1-4.	Attaching with the Telephone Twisted-Pair TMA Feature	1-9
1-5.	TTP TMA Port Assignment and Wire-Pair Orientation	1-10
1-6.	Physical Setup to Support up to Sixty-four 3270-Type Devices (Using 3299 Model 32s)	1-11
1-7.	Example of 3174 Using Fiber Optics	1-11
1-8.	Asynchronous Emulation Adapter Device Attachments	1-12
1-9.	ISDN Network Connection	1-14
1-10.	Example of an ISDN Adapter Installed on a Model 21R	1-15
1-11.	An Example of a 3174 LAN Network Connection	1-16
1-12.	3174 Internal Data Flow	1-20
1-13.	Hardware Configuration Table Example	1-25
1-14.	Event Log (Example only)	1-31
1-15.	Data Stream Trace Example 1	1-33
1-16.	Data Stream Trace Example 2	1-33
1-17.	Status Codes Displayed on the Operator Panel	1-34
1-18.	Log Records Panel	1-35
1-19.	3174 Operator Panel	1-37
1-20.	Power Switch	1-39
2-1.	Using the LEDs on the FTA and 3299-32 for Problem Determination	2-22
2-2.	Port Status Worksheet	2-62
2-3.	Diagnostic Test Menu Example	2-104
2-4.	Test Parameters Menu	2-104
2-5.	Selectable Functions Menu Example	2-105
2-6.	Display Scan Defect Table in Terminal Mode (example)	2-113
2-7.	CCITT V.35 Three-Switch TEST/OPER Switch	2-119
2-8.	EIA 232D Communication Line Flow (Cable and Wrap Plug)	2-120
2-9.	X.21 Communication Line Flow (Switched and Nonswitched) (Cable and Wrap Plug)	2-121
2-10.	V.35 Communication Line Flow (Cable and Wrap Plug)	2-122
2-11.	Tailgate Assembly Pin Locations	2-125
2-12.	Tailgate Assembly Pin Locations Internal Channel	2-127
2-13.	EIA 232D External Interface Cabling to a DTE (U.S.A./Canada)	2-131
2-14.	EIA 232D External Interface Cabling to a DTE World Trade (Europe, Americas, Far East)	2-132
2-15.	EIA 232D IBM-Supplied Cabling to a DTE (U.S.A./Canada)	2-133
2-16.	EIA 232D IBM-Supplied to a DTE (Europe, Americas, Far East)	2-134
2-17.	EIA 232D External Interface Cabling to a DCE (U.S.A./Canada)	2-135
2-18.	EIA 232D External Interface Cabling to a DCE (Europe, Americas, Far East)	2-136
2-19.	Null Modem Wiring (U.S.A./Canada)	2-137
2-20.	Null Modem Wiring (Europe, Americas, Far East)	2-138
2-21.	Block Diagram of Terminal Adapter Terminal Attachment	2-140
2-22.	Token-Ring Adapter Line Flow (Cable and Wrap Plug)	2-144
2-23.	Running a Wrap Test on the ISDN Cable	2-146
2-24.	Removing the Wrap Plug from the Wrap Coupler	2-146
2-25.	ISDN Adapter Cable Wiring (U.S., Canada, and Japan)	2-147
2-26.	ISDN Adapter Wrap Plug Wiring (U.S., Canada, and Japan)	2-148
2-27.	Test Log	2-151
2-28.	Hardware Configuration Table Example	2-153
2-29.	3174 Test Menu	2-163
2-30.	Test 0: Terminal Check Panel	2-165

2-31.	Test 1 Menu	2-166
2-32.	Example of an RTM Log Panel—Configuration Support B	2-167
2-33.	Example of a Log Record Display Panel	2-168
2-34.	Example of an Event Log Summary Panel	2-171
2-35.	Test 2: Configuration Menu	2-172
2-36.	Example of a Hardware Configuration Table Panel	2-173
2-37.	Test 3: 3270 Device Status Menu	2-175
2-38.	Example of a Status Summary Panel	2-176
2-39.	Example of an Error Counters Panel Showing a Disabled Adapter and Disabled Port	2-178
2-40.	Example of a Connectivity Panel Showing an Enabled Adapter and Host Unconfigured	2-179
2-41.	Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Display	2-180
2-42.	Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Display with Host Addressable Printer	2-181
2-43.	Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Printer	2-181
2-44.	Example of a Connectivity Panel Showing an Enabled Adapter for 3174-Peer	2-182
2-45.	Example of an LU Status Summary Panel	2-183
2-46.	Example of a DLUR Connectivity Panel Showing DLUR LU Status	2-184
2-47.	Test 4: Reset Log Menu	2-185
2-48.	Example of a Vital Product Data Menu	2-187
2-49.	Example of a Controller Vital Data Panel—Configuration Support B	2-188
2-50.	Example of a Controller Vital Data Panel—Configuration Support C	2-190
2-51.	Update Controller Vital Data Panel—Configuration Support B	2-192
2-52.	Update Controller Vital Data Panel—Configuration Support C	2-193
2-53.	Example of a Port Vital Data Panel	2-194
2-54.	Example of an Update Port Vital Data Panel	2-195
2-55.	Example of Displayed Extended Vital Product Data	2-196
2-56.	Example of an Update Panel for Extended Vital Product Data	2-197
2-57.	Test 6: Display Control Areas Menu	2-198
2-58.	X.25 Link Control Data Panel Used as a Sample for Locating Bytes (partial representation)	2-199
2-59.	Example of a Display Register Pages Panel	2-199
2-60.	Example of a Port Control Area Panel	2-201
2-61.	Example of an LT Control Area Panel	2-202
2-62.	Example of an LTE Control Area Panel in 1TEST	2-203
2-63.	Example of an LTE Control Area Panel in 2TEST	2-203
2-64.	Example of an X.21 Short-Hold Mode Host Control Data Panel	2-208
2-65.	Example of a Port Control Area Panel for Specified Host	2-210
2-66.	Example of an X.25 Link Control Data Panel	2-211
2-67.	Example of an X.25 Host Control Data Panel	2-212
2-68.	Test 9: Token-Ring Test Menu	2-214
2-69.	Test 9: LAN Test Menu	2-214
2-70.	Token-Ring Status Panel	2-215
2-71.	Monitor LAN Status Panel	2-216
2-72.	Example of a Token-Ring Adapter Status Summary Panel	2-217
2-73.	Example of an Ethernet Adapter Status Summary Panel	2-219
2-74.	Example of a Link Status Summary Panel for a 3174 Token-Ring Gateway	2-221
2-75.	Example of a Link Status Summary Panel	2-221
2-76.	Example of a Gateway Host Status Summary Panel	2-226
2-77.	Example of the Update 3174-Peer Status Panel	2-227
2-78.	Example of a 3174-Peer Bridge Profile	2-229
2-79.	Example of a 3174-Peer Bridge Status Panel	2-231
2-80.	Example of a 3174-Peer Bridge Status Panel Showing the Previous 12 Hours	2-232
2-81.	Update LAN Manager Profile Panel	2-233
2-82.	Test 10: Port Wrap Test Menu	2-235
2-83.	Test 12: Asynchronous Emulation Adapter Tests Menu	2-237

2-84.	Asynchronous Emulation Adapter Port Tests Menu	2-238
2-85.	Example of an Asynchronous Emulation Adapter Status Summary Panel	2-240
2-86.	Example of an AEA Error Counters Panel Showing a Disabled Adapter and Disabled Port	2-241
2-87.	Example of an AEA Connectivity Panel Showing an Enabled Adapter and Display/Printer with an ASCII Host	2-242
2-88.	Example of and AEA Port Wrap Status Panel.	2-243
2-89.	Example of an AEA Cable Test Report Panel.	2-244
2-90.	Example of a Test 12, Option 8 DLUR Connectivity Panel Showing DLUR LU Status	2-245
2-91.	Test A: Alert Message Panel	2-246
2-92.	Test 13: ESCON Adapter Menu	2-248
2-93.	Example of an ESCON Adapter Status Panel (Online Mode)	2-249
2-94.	Example of ESCON Adapter Status Panel (Offline Mode—OLS Not Running)	2-250
2-95.	Example of ESCON Adapter Status Panel (Offline Mode—OLS Running)	2-250
2-96.	Test 14: 3174 Operator Functions	2-253
2-97.	Example of a 3174 Operator Functions Panel After Completing Option 2	2-255
2-98.	Example of a Host Status Summary Panel	2-257
2-99.	Test 16: ISDN Adapter Tests Menu	2-258
2-100.	Example of an ISDN Adapter Status Summary Panel	2-259
2-101.	Example of an ISDN Gateway Host 1A Status Summary Panel	2-260
2-102.	Example of an ISDN Performance Counter Display Panel	2-262
2-103.	Example of an ISDN Error Counter Display Panel for Layer 1	2-264
2-104.	Example of an ISDN Error Counter Display Panel for Layer 2	2-265
2-105.	Example of an ISDN Error Threshold Counter Change Panel for Layer 1	2-266
2-106.	Example of an ISDN Error Threshold Counter Change Panel for Layer 2	2-267
2-107.	Test 17: APPN Test Menu	2-268
2-108.	Example of a Node Status Panel	2-269
2-109.	Example of a Adjacent Nodes Panel	2-270
2-110.	Example of a Link Status Panel	2-272
2-111.	Example of a Session Status Panel	2-275
2-112.	Example of a Pending Session Route Panel	2-276
2-113.	Active Locate Requests Panel	2-277
2-114.	An Example of a Local LU 6.2 Session Status Panel	2-278
2-115.	Test 18: Frame Relay Test Menu	2-279
2-116.	An Example of a Frame Relay Port Summary Information Panel.	2-280
2-117.	An Example of an Update Frame Relay Panel	2-281
2-118.	An Example of a Panel Listing Status and Data Types for All DLCIs	2-282
2-119.	An Example of a List-Specific DLCI Status Summary Panel	2-283
2-120.	Example of a Link Status Summary Panel for a 3174 Attached to an Ethernet Network and Functioning as an APPN Network Node	2-284
2-121.	Master Menu Configuration B	2-289
2-122.	Patch Menu	2-302
2-123.	Disk Drive Selection Menu	2-303
2-124.	Disk Drive Selection Menu	2-303
2-125.	Patches Panel	2-304
2-126.	Patch Header Panel	2-305
2-127.	Patch Data Panel	2-305
2-128.	Relocatable Information Panel	2-306
2-129.	Call to Patch Area Panel	2-306
2-130.	Patches Panel (Adding a Zap Patch)	2-307
2-131.	Patch Header Panel (Adding a Zap Patch)	2-308
2-132.	Zap Patch Panel	2-308
2-133.	Patches Panel with One Patch Installed	2-309
3-1.	3174 Component Locations on the Model 21L	3-2
3-2.	3174 Component Locations on the Models 21R and 23R	3-3

3-3.	3174 Component Locations on the Model 22L	3-3
3-4.	ISDN Adapter Cables	3-6
3-5.	Card Removal/Replacement (Thumbscrews)	3-9
3-6.	Storage Card Removal/Replacement	3-10
3-7.	Power Supply Removal	3-11
3-8.	Planar Removal	3-13
3-9.	Fan Removal	3-15
3-10.	Diskette Drive Removal	3-16
3-11.	Fixed Disk Removal	3-17
3-12.	Tailgate Assembly Removal	3-18
3-13.	Logic Board Removal	3-20
3-14.	Fiber Optic Cable Strain Relief	3-20
4-1.	Tailgate Assembly with Priority Switches	4-3
4-2.	Adding a 3174 on End-of-Channel	4-5
4-3.	Replacing an Existing 3274 on a Channel Interface	4-6
4-4.	Adding a 3174 not on the End-of-Channel	4-7
5-1.	Safety Label Location	5-4
5-2.	ISDN Adapter Card	5-5
5-3.	ISDN Adapter Card Safety Label	5-5
A-1.	BNC and DPC Connectors	A-4
A-2.	3299 Cabling	A-6
B-1.	Controller/Terminal Responses in Dial-In State	B-9
B-2.	Key Operations during X.25 States	B-11
B-3.	Dial Mode Screen	B-14
B-4.	PVC States and Indicators	B-17
B-5.	SVC States and Indicators	B-18
C-1.	Data Link Control Function	C-3
C-2.	Key Operation (During X.21 Switched States)	C-7
C-3.	Key Operation in Dial-In Mode	C-8

Tables

1-1.	3174 Base and Optional Hardware—Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R	1-6
1-2.	Hardware Group Numbers	1-21
1-3.	Alt 1 IML Device, Function, and Parameter Selections	1-42
1-4.	Wrap Plugs	1-46
2-1.	Using the LEDs on the FTA and 3299-32 for Problem Determination	2-22
2-2.	Test Sequence for Model 21R	2-96
2-3.	Function Numbers and Function Parameters	2-99
2-4.	Test Parameters	2-101
2-5.	Hardware Group Numbers (Basic Tests)	2-107
2-6.	Test Parameters (Basic Tests)	2-107
2-7.	Function Numbers (Communication)	2-117
2-8.	CCITT V.35 TEST/OPER Switch Settings	2-119
2-9.	Wrap Test Analysis Chart A	2-124
2-10.	Wrap Test Analysis Chart B	2-125
2-11.	Internal Channel Terminator Pin Assignments	2-126
2-12.	Wrap Block Signal Distribution	2-127
2-13.	Function Numbers and Function Parameters (Port Wrap)	2-140
2-14.	Token-Ring Adapter Function Numbers	2-142
2-15.	ISDN Adapter Function Numbers and Function Parameters	2-145
2-16.	Ethernet Adapter Optional Test Function Numbers	2-149
2-17.	Test Log Function Numbers	2-151
2-18.	Test Monitor Function Numbers	2-152
2-19.	Hardware Group Numbers	2-169
2-20.	Valid Characters	2-192
2-21.	Device and Control Area Information	2-200
2-22.	Port Control Area Bit Definitions	2-204
2-23.	LT Control Area Bit Definitions	2-206
2-24.	X.21 XID Summary	2-209
2-25.	Function Classes	2-234
2-26.	IBM 584x Modem Switch Settings	2-298
2-27.	Hayes Smartmodem 1200 Configuration Switch Settings	2-299
2-28.	Hayes Smartmodem 1200 S Register Settings	2-300
2-29.	BN Numbers with Corresponding Locations	2-316
2-30.	T3174B OLT Routines	2-319
2-31.	Model 21L CDS Card Format (SNA)	2-319
2-32.	T3174A OLT Routines	2-321
2-33.	Model 21L CDS Card Format (non-SNA)	2-321
2-34.	3174 Model 21R OLTs	2-322
3-1.	Type Numbers	3-4
3-2.	Interrupt Level Chart	3-5
3-3.	Card Location for AEAs and CCAs.	3-7
3-4.	Storage Card Plugging	3-8
4-1.	Priority Switch Settings	4-2
4-2.	UCW Settings (370 Mode)	4-4
4-3.	UCW Settings (370 XA Mode)	4-4
4-4.	Host-Channel Customizing Parameters	4-8
A-1.	3299 Maximum Wire Lengths	A-5
B-1.	X.25 Timer Values	B-3
B-2.	X.25 Operator Information Area Status Indicators	B-7

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe on any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the IBM Director of Licensing, IBM Corporation, 208 Harbor Drive, Building 1, STAMFORD, CT 06904, USA.

Trademarks

The following terms, which are denoted by an asterisk (*) in this publication, are trademarks of the IBM Corporation in the United States or other countries or both:

Advanced Peer-To-Peer Networking	ES/3090
APPN	ES/9000
Enterprise Systems Connection Architecture	IBM
Enterprise System/3090	Netview
Enterprise System/9000	Personal System/2
ES	PS/2
ESA/390	System/370
ESCON	System/390

The following terms, denoted by a double asterisk (**) in this publication, are trademarks of other companies:

Hayes	Micom
Hayes Microcomputer Products, Inc.	Micom Systems Inc.
Hayes Smartmodem 300	Micom Data Modem 3012
Hayes Microcomputer Products, Inc.	Micom Systems Inc.
Hayes Smartmodem 1200	Micom Data Modem 3024
Hayes Microcomputer Products, Inc.	Micom Systems Inc.

About This Book

This manual provides information you will need to maintain the IBM 3174 Establishment Controller Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

Who Should Use This Book

This book is for the product-trained and support-trained IBM service representative who maintains the 3174 Establishment Controller Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

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

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

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

Support-Trained Service Representative and Area-Designated Specialist: The support-trained service representative and the area-designated specialist use their in-depth knowledge of telecommunication and of the product to continue problem determination beyond the scope of the maintenance manual.

How This Book Is Organized

This manual has the following chapters and appendixes:

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

Chapter 2, Diagnostic Information: Contains a symptom chart, maintenance analysis procedures (MAPs), offline and online tests, and general procedures. Instructions on when to use a particular MAP are provided by the symptom chart.

Chapter 3, Repair Information: Contains locations, card-plugging charts, and removal/replacement procedures.

Chapter 4, Installation: Contains information on how to install the Model 21L.

Chapter 5, Safety Inspection Guide: Contains information to determine whether a machine can be placed on an IBM maintenance agreement.

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

Appendix A, 3299 Reference Information: Contains 3299 Terminal Multiplexer reference information.

Appendix B, X.25 Feature: Contains information about the X.25 feature.

Appendix C, X.21 Feature: Contains information about the X.21 feature.

Glossary of Terms and Abbreviations: Defines terms and abbreviations used in this manual. It precedes the Index.

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 IBM manuals you need to perform these tasks.

To Find Translations of Safety Notices:

Safety Notices, GA27-3824

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

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, 12L, 12R, 13R and 14R User's Guide, GA23-0337

Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R User's Guide, GA27-3874

Models 51R, 52R, 53R, 61R, 62R, 63R, and 64R User's Guide, GA23-0333

Models 81R, 82R, 90R, 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

ASCII Functions Reference, GA27-3872

Configuration Support B

Planning Guide, GA27-3862

Model 90R Tokenway Planning, GD21-0036

Utilities Guide, GA27-3863

Central Site Customizing User's Guide, GA27-3868

ASCII Functions Reference, GA27-3872

Configuration Support C

Planning Guide, GA27-3918
Utilities Guide, GA27-3920
Central Site Customizing User's Guide, GA27-3919
ASCII Functions Reference, GA27-3872

To Perform Problem Determination:

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

To Install Features or Convert Models on the 3174:

Fixed Disk Installation and Removal Instructions, GA27-3864
Diskette Drive Installation and Removal Instructions, GA23-0263
Device Control Adapters Installation and Removal Instructions, GA23-0265
Model Conversion Instructions, GA23-0295
Token-Ring Network Feature and Ethernet Network Feature Installation and Removal Instructions, GA23-0329
Storage Expansion Feature Installation and Removal Instructions, GA23-0330
Communication Adapter Installation and Removal Instructions, GA27-3830
Asynchronous Emulation Adapter Installation and Removal Instructions, GA23-0341
Concurrent Communication Adapter and Integrated Services Digital Network Adapter Installation and Removal Instructions, GA27-3851
Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R Feature Installation and Removal Instructions, GA27-3875

To Use the Asynchronous Emulation Adapter Feature:

ASCII Functions Reference, GA27-3872
Terminal User's Reference for Expanded Functions, GA23-0332

To Use the Multiple Logical Terminals Function:

Terminal User's Reference for Expanded Functions, GA23-0332

To Obtain Data Stream Programming and Reference Information:

Functional Description, GA23-0218
Data Stream Programmer's Reference, GA23-0059
ASCII Functions Reference, GA27-3872
3174 Reference Summary, GX27-3872
3174 Character Set Reference, GA27-3831
3270 X.25 Operation, GA23-0204

To Perform Maintenance (Service Personnel):

Models 1L, 1R, 2R, 3R, 11L, 11R, 12L, 12R, 13R, and 14R Maintenance Information, SY27-2572
Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R Maintenance Information, SY27-0323
Models 51R, 52R, 53R, 61R, 62R, 63R, and 64R Maintenance Information, SY27-2573
Models 81R, 82R, 90R, 91R, and 92R Maintenance Information, SY27-2584
CE Reference Summary, SX27-3873
Status Codes, GA27-3832

I To Install, Customize, and Service the 8250 Workstation Networking Module

I *8250 Workstation Networking Module Installation and Customization Guide, GA27-4022*
I *3174 Planning Guide - Configuration Support C, GA27-3918*

Utilities Guide - Configuration Support C, GA27-3920
8250 Workstation Networking Module Problem Determination and Service Guide, SY27-0342

Other Related Publications

The following publications are available for the 3174. They are developed by the International Technical Support Center. The intended audience for these books are IBM System Engineers and Customer Network Planners.

Installation Guidelines for IBM Token-Ring Network Products, GG24-3291
3174 Establishment Controller Installation Guide, GG24-3061
3174 Establishment Controller APPN Implementation Guide, GG24-3702
APPN Architecture and Product Implementations Tutorial, GG24-3669
NetView Distribution Manager Release 2 and 3174 Central Site Change Management Implementation Guide, GG24-3424
3174 CECP Migration Issues, GG24-3380
3174 Workstation Peer Communication Support Program User's Guide, available with the 3174-WPCSP, P/N 96X5677

The following books may also be useful when working with your 3174 or its attached network.

ES Connection Fault Isolation, SY22-9533
Cabling System Planning and Installation Guide, GA27-3361
ESCON Cable Connector Cleaning Procedures, SY27-2604
Token-Ring Network Problem Determination Guide, SX27-3710
NetView Operations, SC31-6019
3299 Terminal Multiplexer Product Information and Setup, G520-4216
3299 Model 32 Planning for Optical Fiber Cable, GA27-3902
Local Area Network Technical Reference, SC30-3383
Token-Ring Network Architecture Reference, SC30-3374
Local Area Network Administrator's Guide, GA27-3748
Token-Ring Network Installation Guide, GA27-3678
Token-Ring Network Bridge Program,
 Version 1.1 available with P/N 83X8880
 Versions 2.0 and 2.1 available with P/N 16F0493
 Version 2.2 available with P/N 53F7724.
TCP/IP Tutorial & Technical Overview, GG24-3376
SNA – APPN Architecture Reference, SC30-3422
SNA Formats, GA27-3136

What Has Changed in This Edition

| Sixth Edition (June 1994)

| This edition covers 3174 microcode:

- | • Configuration Support A and S Release 5
- | • Configuration Support B Release 4
- | • Configuration Support C Release 5.

| The problem diagnosis information or online tests have been added or changed for the following 3174 functions in the Configuration Support C Release 5 microcode:

- | • Ethernet Adapter
- | • Frame Relay Communications
- | • Advanced Peer-to-Peer Networking* (APPN*) enhancements.

| Various minor corrections have been made throughout and may or may not be indicated by a revision bar.

Major changes are indicated by a vertical bar (|) in the left margin.

Chapter 1. General Information

Introduction	1-3
Service Strategy	1-4
3174 Hardware	1-5
Base Hardware	1-5
3174 Feature Descriptions	1-7
Terminal Adapter (HG 26)	1-7
Terminal Adapter (HG 26 and HG 27)	1-7
Telephone Twisted-Pair TMA Feature	1-8
3299 Model 32 Terminal Attachment	1-11
Asynchronous Emulation Adapter	1-12
Gateway Function	1-13
ISDN Gateway	1-13
LAN (Token-Ring or Ethernet) Gateway	1-15
Token-Ring Attachment	1-17
Ethernet Attachment	1-17
Multi-Host Support	1-18
Concurrent Communication Adapter	1-18
Single Link Multi-Host Support	1-19
ES Connection Channel Single Link Multi-Host Support	1-19
X.25 Single Link Multi-Host Support	1-19
Token-Ring Single Link Multi-Host Support	1-19
3174 Data Flow	1-19
Hardware Group and Type Numbers	1-21
3174 FRU Descriptions and Functions	1-21
Field Replaceable Unit Identification (FRU ID)	1-25
Status Codes	1-26
Status Code Display Format	1-26
How to Interpret the Status Codes Listing	1-26
Operational Status Code Operator Panel Presentation	1-27
Offline Test Status Code Presentation	1-29
Status Code Assignments	1-29
3174 Event Log	1-31
Diskettes	1-36
Operator Panel	1-37
Indicators	1-37
Keypad	1-38
Function Push Buttons	1-38
Channel Interface Switch (Model 21L only)	1-38
AC Power Switch	1-39
DC Power Indicator	1-39
Central Site Change Management	1-39
3174 IML Selections for CSCM	1-40
Normal Initial Microcode Load (IML)	1-41
Alt 1 Normal IML Description	1-41
Alt 1 Normal IML Procedure	1-41
Alt 2 IML Procedures (Test 82)	1-43
Procedure A – Test 82	1-43
Procedure B – Test 82	1-44
Environmental Restrictions	1-44
Environmental Classifications	1-44

3174 Temperature and Humidity Limits	1-44
3174 Acoustics	1-44
Special Tools	1-45

Introduction

This chapter provides the following general information about the IBM 3174 Establishment Controller Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R:

- Service strategy
- Configurations
- General description
 - Field replaceable unit (FRU) descriptions
 - Hardware group numbers
 - Type numbers
 - FRU identification
 - Status code description
 - 3174 event log description
 - Operator panel
- Features
 - Terminal Adapter
 - 3270 Port Expansion
 - Asynchronous Emulation Adapter
 - Gateway function
 - Token-Ring Adapter
 - Ethernet adapter
 - Integrated Services Digital Network (ISDN) Adapter
 - Fiber Optic Terminal Adapter
 - Concurrent Communication Adapter.
- Central Site Customizing
- Initial Microcode Load (IML)
 - Normal IML
 - Alt 1 IML
 - Alt 2 IML
- Environmental restrictions
- Special tools and test equipment.

Models 21L and 21R require Configuration Support B Release 2 or higher microcode. Model 22L requires Configuration Support B Release 3 or higher. Model 23R requires Configuration Support B Release 4 or higher. Model 24R requires Configuration Support C Release 4 or higher.

General Description

Service Strategy

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

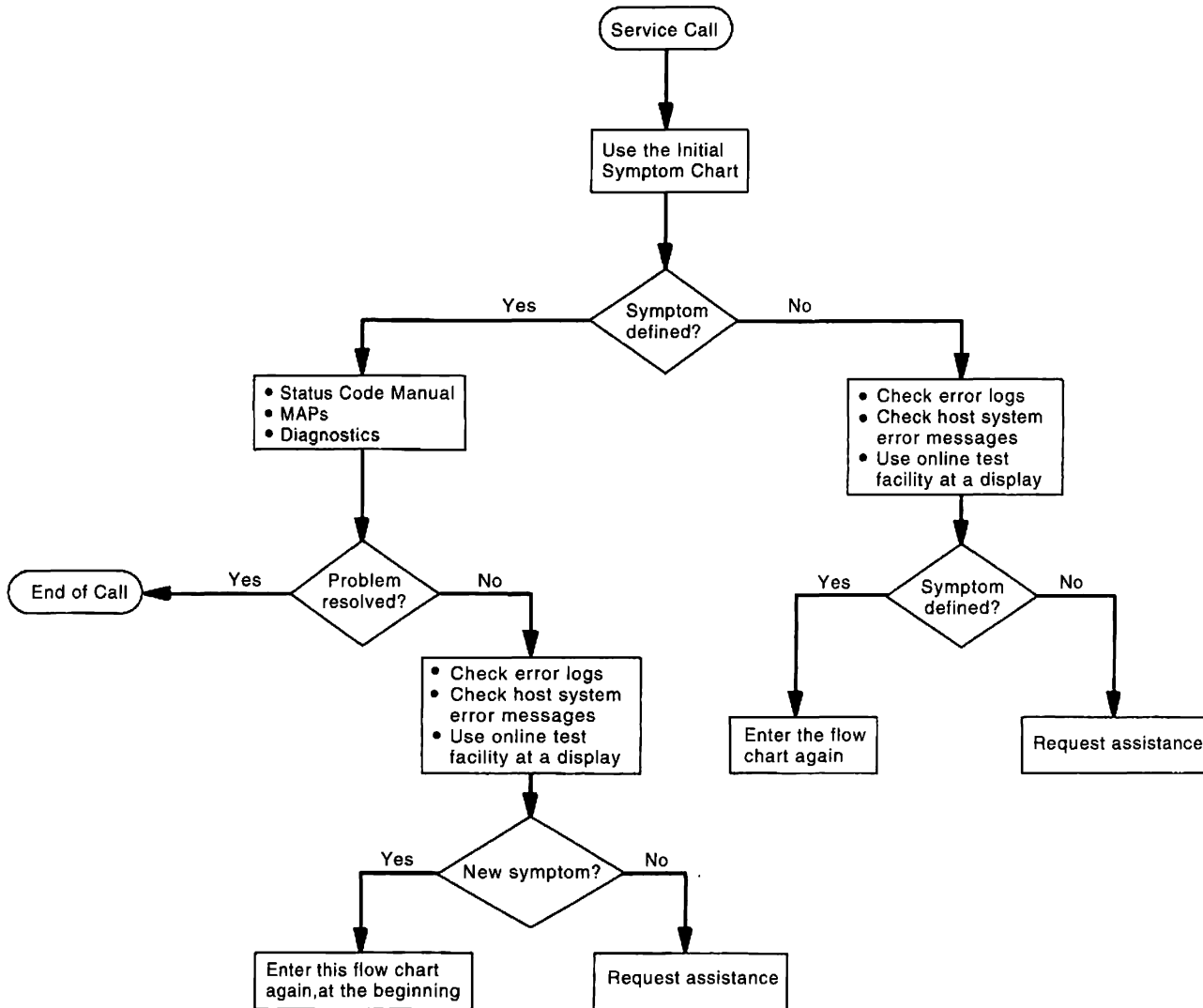


Figure 1-1. 3174 Service Strategy

The approach shown in Figure 1-1 applies to all problems that occur on the controller. In the case of token-ring problems, if the failure appears to be outside of the controller, the customer should use the *IBM Token-Ring Network Problem Determination Guide* and the *IBM Token-Ring Network Problem Diagnostic* test. This diagnostic is controlled from a personal computer system, such as an IBM Personal System/2 (PS/2) computer that is attached to the ring.

3174 Hardware

The 3174 Establishment Controller Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R are available in a base-hardware configuration. Additional features can be ordered and set up by the customer. The controller is compatible with Systems Network Architecture (SNA) and non-SNA. A description of the base and feature hardware and host communication configurations follows:

Base Hardware

Channel Adapter	This adapter is available only for the Model 21L. It supports SNA or non-SNA and attaches to a System/370* host through a byte multiplexer, selector, or block multiplexer channel to the following processors: 308x, 309x, 4361, 4381, and 9370.
Enterprise Systems Connection Adapter	This adapter is available only for the Model 22L. It provides an interface from the 3174 Model 22L to a System/390* host system through a fiber optic link.
Communication Adapter	This adapter is available for the Models 21R, 22L, 22R, 23R, and 24R. The Communication Adapter provides EIA 232D (CCITT V.24/V.28) or CCITT V.35 electrical interface to a modem or other signal converter for remote operation.
Terminal Adapter	Supports four directly attached terminals, or up to 32 terminals through 3299s or Terminal Multiplexer Adapters (TMAs).
Storage Size	2MB (MB = 1 048 576 bytes).
2.4MB Diskette Drive	Reads and writes 5.25-inch 1.2MB or 2.4MB diskettes.
Power	Models 21H, 21L, 22L, 23R or 24R: 100 to 127 Volts or 200 to 240 Volts ac Model 22R and 21R: 100 to 127 Volts ac (U.S. and Canada), 100 to 127 Volts or 200 to 240 Volts ac (EMEA)

Optional Hardware Features

- One 3270 Port Expansion Feature that provides support for up to sixty-four 3270-type terminals or printers. This feature takes the place of the base planar board.
- A maximum of four Terminal Multiplexer Adapter (TMA) cards. Eight terminals attach to each TMA card.
- When the 3270 Port Expansion Feature is installed, a maximum of two Telephone Twisted-Pair Terminal Multiplexer Adapter (TTP TMA) feature cards. 32 terminals attach to each TTP TMA card by way of telephone twisted-pair cables

Note: The twisted-pair cables are provided by the customer.

- A maximum of three Fiber Optic Terminal Adapter (FTA) cards. An FTA is needed when you connect the 3299 Model 32 to the 3174 with fiber optic cable.
- One additional diskette drive or 20MB fixed disk drive.
Note: A second diskette drive or a fixed disk drive is required to support distributed function terminals (DFTs) that need a Downstream Load (DSL) or the Asynchronous Emulation Adapter (AEA).
- Storage Features: 1MB, 2MB, 4MB, or 6MB (1 MB equals 1 048 576 bytes).
- One IBM 16/4 Megabits per second (Mbps) token-ring adapter.

General Description

- One Ethernet adapter.
- A maximum of four Integrated Services Digital Network (ISDN) Adapter cards. Each adapter has four ports. Each port supports two connections, enabling a total of eight connections for each ISDN Adapter.
- A maximum of three Asynchronous Emulation Adapter (AEA) cards. Up to eight ASCII terminals, modems, or hosts can be attached to each AEA card.
- Up to two Concurrent Communication Adapters. These are available as Type 1 (EIA 232D [CCITT V.24/V.28] and CCITT V.35) or Type 2 (CCITT X.21 [V.11]).

Table 1-1 shows base hardware and optional features available for Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

Table 1-1. 3174 Base and Optional Hardware—Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R

Base Hardware or Feature	21H/L	21R	22R	22L	23R	24R
Channel Adapter	B	X	X	X	X	X
Enterprise Systems Connection Adapter	X	X	X	B	X	X
Terminal Adapter	B	B	B	B	B	B
Terminal Adapter for the 3270 Port Expansion Feature	O	O	O	O	O	O
2MB Base Storage	B	B	B	B	B	B
1MB Storage Expansion	O	O	O	O	O	O
2MB Storage Expansion	O	O	O	O	O	O
4MB Storage Expansion ¹	O	O	O	O	O	O
6MB Storage Expansion ²	O	O	O	O	O	O
Diskette Drive 1	B	B	B	B	B	B
Diskette Drive 2	O	O	O	O	O	O
Fixed Disk Drive 1	O	O	O	O	O	O
Terminal Multiplexer Adapter	O	O	O	O	O	O
Fiber Optic Terminal Adapter	O	O	O	O	O	O
Token-Ring Adapter	O	O	O	O	B	O
Ethernet Adapter	O	O	O	O	O	B
Integrated Services Digital Network (ISDN) Adapter	O	O	O	O	X	X
Asynchronous Emulation Adapter	O	O	O	O	O	O
Type 1 Communication Adapter	X	B	X	B	B	B
Type 2 Communication Adapter	X	X	B	X	X	X
Type 1 Concurrent Communication Adapter	O	O	O	O	O	O
Type 2 Concurrent Communication Adapter	O	O	O	O	O	O

Legend:

B = Base

O = Optional

X = Not Available on this model

¹Available as a storage upgrade to a maximum of 6MB.

²Available as a factory-installed feature when ordering new controllers.

3174 Feature Descriptions

This section contains descriptions of the features and functions found in the 3174:

Terminal Adapter (HG 26)

The controller provides four dual-purpose connectors on the rear of the controller for attachment of terminals, Terminal Multiplexer Adapters (TMAs), and 3299 terminal multiplexers. The controller supports up to thirty-two 3270-type terminals using terminal multiplexers and the base planar board.

The terminals can be attached directly to a Terminal Adapter port or indirectly to a port on a Terminal Multiplexer Adapter or a port on a 3299 Terminal Multiplexer as shown in Figure 1-2.

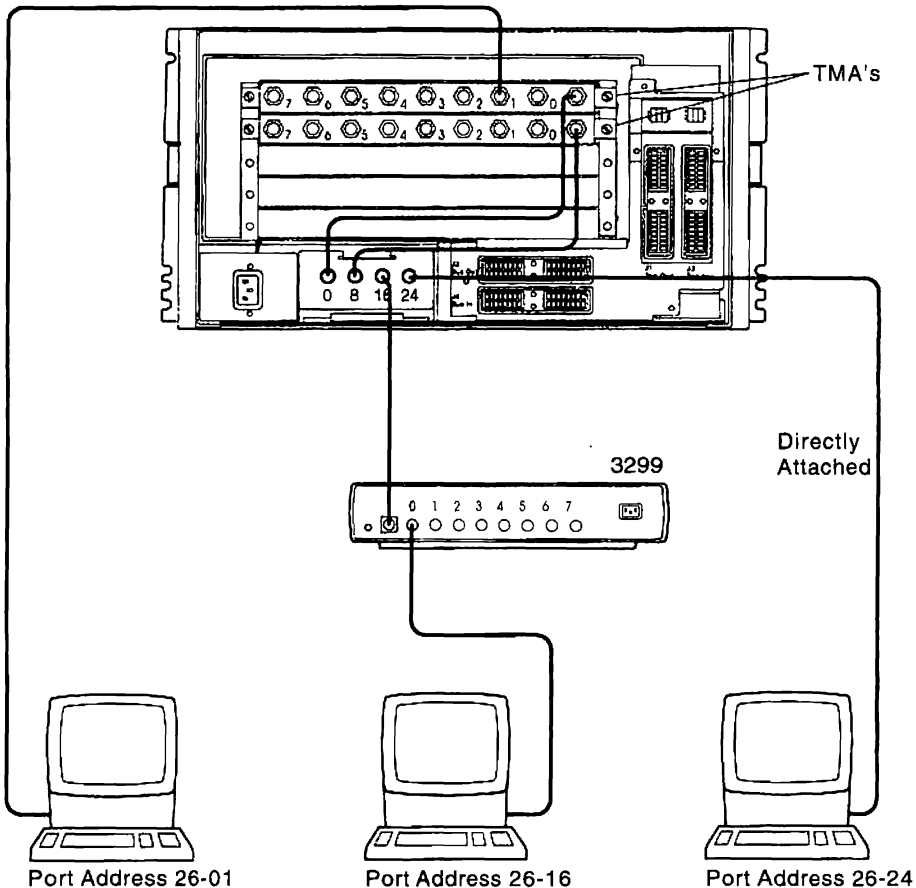


Figure 1-2. Example of 3174 Terminal Attachment

Terminal Adapter (HG 26 and HG 27)

The controller can support up to sixty-four 3270-type terminals using two 3299 Model 32 terminal multiplexers and the optional planar board (3270 Port Expansion Feature). The Terminal Adapter on this planar board has two ports capable of supporting up to thirty-two 3270-type terminals each— 26-0 and 27-0. If you want support for less than 64 devices, you can attach a terminal multiplexer to port 26-8 or 26-16 and have eight active ports.

Figure 1-3 on page 1-8 shows a controller with the optional planar board installed. Figure 1-4 on page 1-9 and Figure 1-6 on page 1-11 shows examples of the physical setup used to provide 64 port capability.

General Description

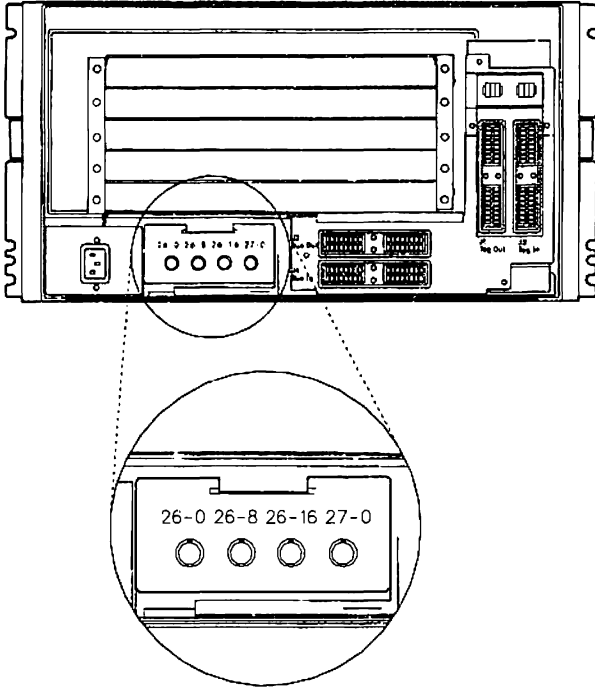


Figure 1-3. Optional Planar Board Containing the 3270 Port Expansion Feature

Telephone Twisted-Pair TMA Feature

- | This feature allows attachment of up to thirty-two 3270-type devices (displays and printers) to the controller through two 25-pair telephone twisted-pair cables, meeting IBM Cabling System (ICS) Type 3 specifications.
- | Figure 1-4 on page 1-9 shows an example of the physical setup for this feature.
- | The TTP TMA does not alter the number of ports supported by the 3174. When the 3270 Port Expansion Feature is present, two TTP TMA cards may be installed in the 3174. Each TTP TMA is capable of supporting 32 devices. When the 3270 Port Expansion Feature is not present, only one TTP TMA may be installed in the 3174.
- | You must attach the TTP TMA to port 0 of the Terminal Adapter (TA) for 32-port support. If the TTP TMA is attached to TA ports 8, 16, or 24, it acts as an eight-port multiplexer, with only ports 0 through 7 of the TTP TMA active.
- | When the TTP TMA is attached to TA port 0, it normally operates in 32-port mode. TA ports 8, 16, and 24 should not be connected to terminals, TMAs, or 3299s.
- | Figure 1-5 on page 1-10 shows the TTP TMA connectors. The TTP TMA has one Dual-Purpose Connector (DPC) and two D-Shell connectors. The J-hook on the D-Shell connectors is provided to ensure correct cable connection.
- | **Note:** The D-Shell connectors used on the TTP TMA are 50-position miniature ribbon jacks (FCC Part 68), referred to in this manual as *D-Shell connectors*.

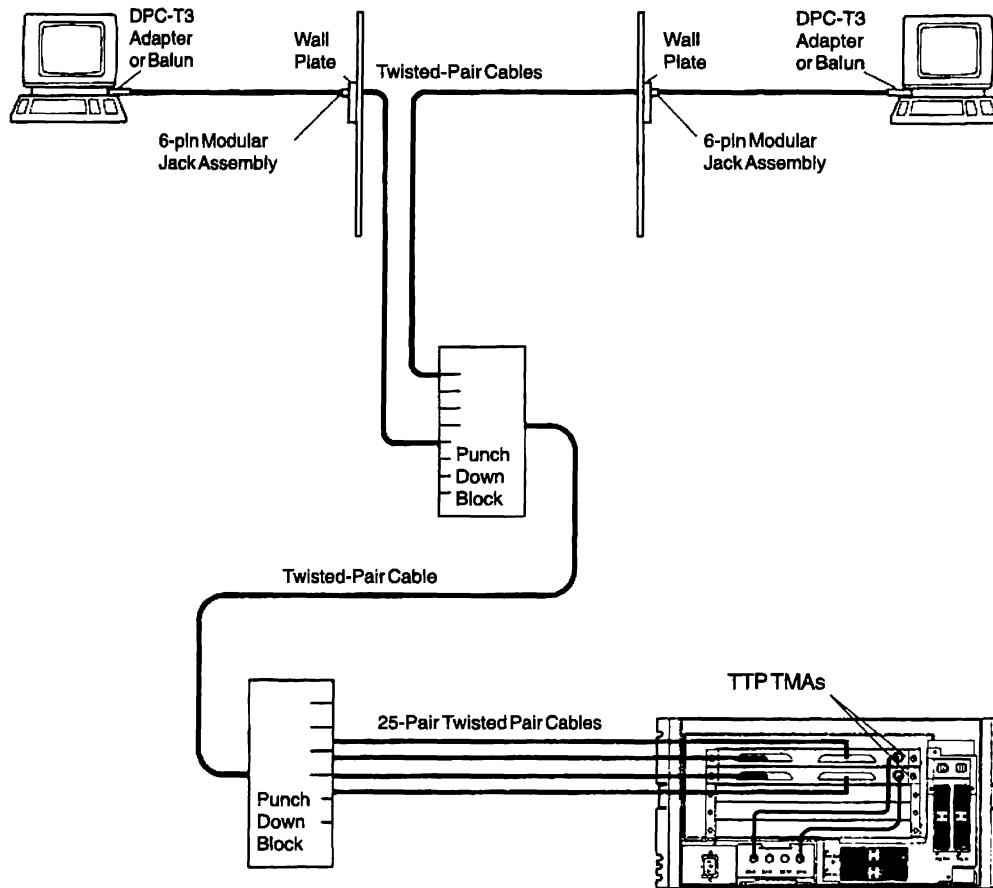
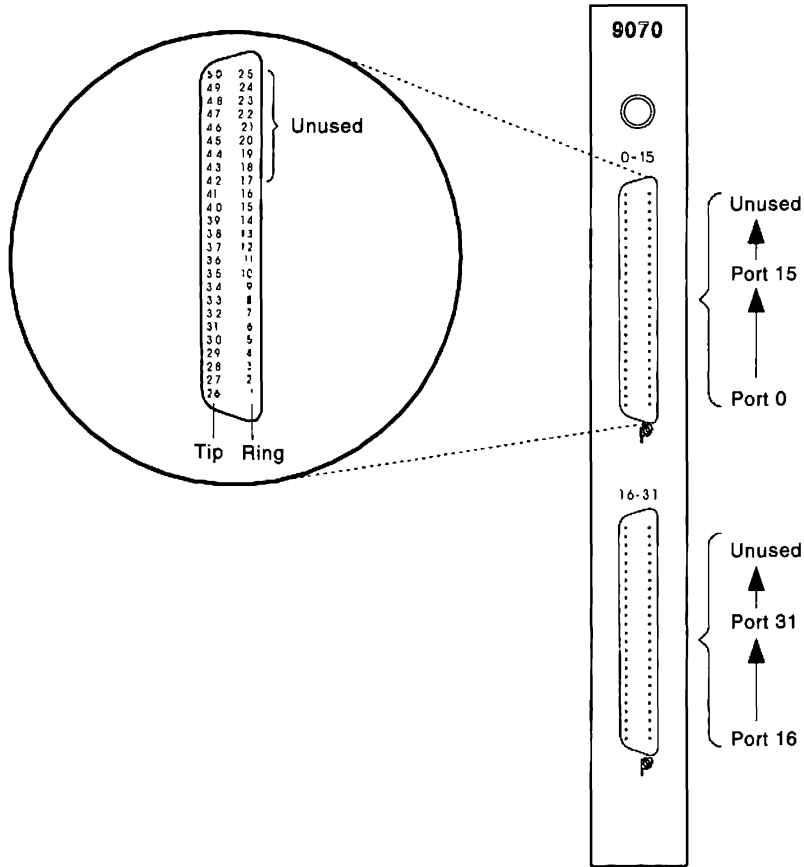


Figure 1-4. Attaching with the Telephone Twisted-Pair TMA Feature

Figure 1-5 on page 1-10 shows the TTP TMA connector tip and ring layout and port assignments. The top D-Shell connector provides ports 0 to 15. The bottom connector provides ports 16 to 31. The D-Shell connector pins 17 to 25 and 42 to 50 are unused.

General Description



Port Number		Tip	Ring
Top Connector	Bottom Connector		
0	16	26	1
1	17	27	2
2	18	28	3
3	19	29	4
4	20	30	5
5	21	31	6
6	22	32	7
7	23	33	8
8	24	34	9
9	25	35	10
10	26	36	11
11	27	37	12
12	28	38	13
13	29	39	14
14	30	40	15
15	31	41	16

Figure 1-5. TTP TMA Port Assignment and Wire-Pair Orientation

3299 Model 32 Terminal Attachment

The 3299 Model 32 supports up to thirty-two 3270-type terminals when it is attached to Terminal Adapter port 26-0 or 27-0. The 3299 attaches to the 3174 using coaxial or fiber optic cable.

The following figure shows 3299 Model 32 Terminal Multiplexers coaxially attached to the 3270 Port Expansion feature Terminal Adapter.

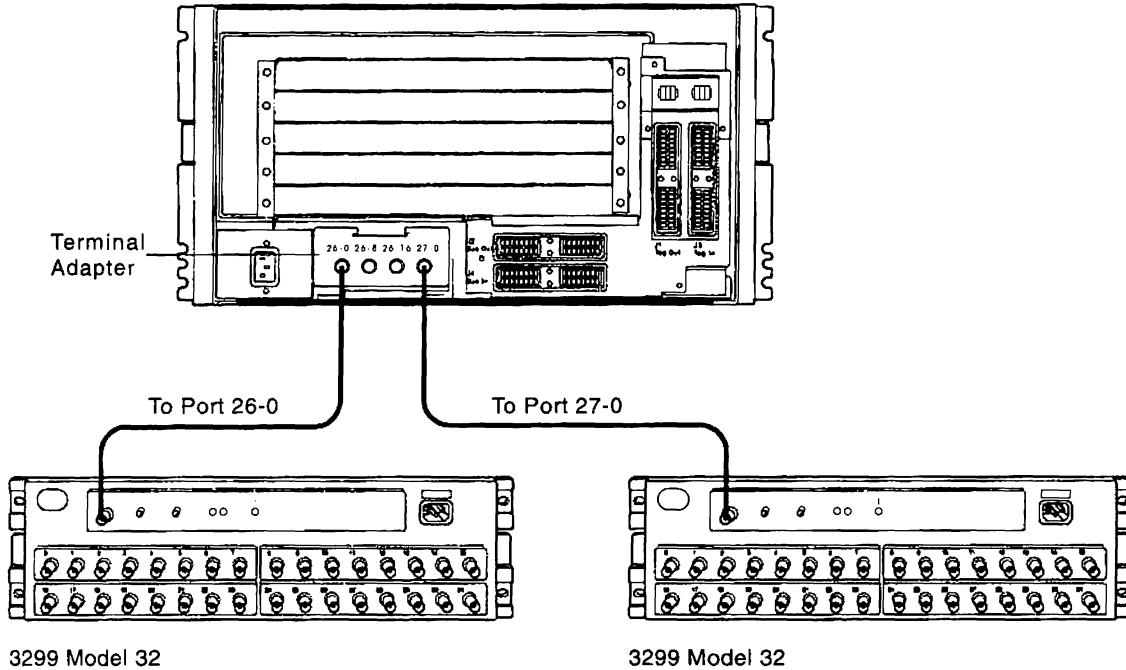


Figure 1-6. Physical Setup to Support up to Sixty-four 3270-Type Devices (Using 3299 Model 32s)

You can also use fiber optic cable and FTAs to attach the 3299s. Figure 1-7 shows the FTA attached to a 3299 Model 32 with fiber optic cable and to the Terminal Adapter with coaxial cable.

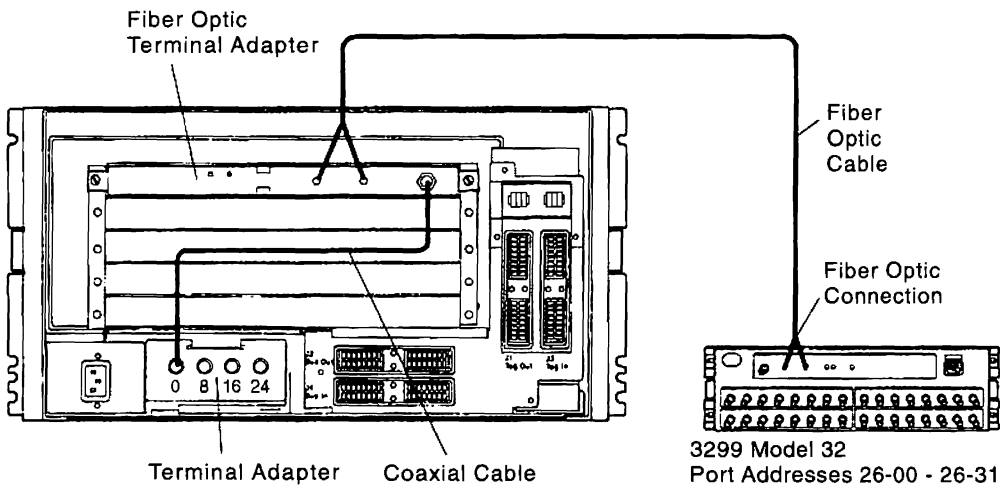


Figure 1-7. Example of 3174 Using Fiber Optics

There can be up to three Fiber Optic Terminal Adapters (FTAs) installed. Using the base planar board, you can attach an FTA or a 3299 Model 32 terminal multiplexer to port 0 to support up to thirty-two 3270-type terminals. If you want fewer terminals, you can attach FTAs to ports 8, 16, and 24. If you have

General Description

the 3270 Port Expansion Feature, you can attach FTAs or 3299 Model 32s to ports 26-0 and 27-0 to support up to sixty-four 3270-type terminals. If you want fewer terminals, you can attach FTAs to ports 26-8, 26-16, and 27-0.

If you are not using fiber optics, you can eliminate the Fiber Optic Terminal Adapter, and use a coaxial cable or IBM Cabling System cable between the Terminal Adapter on the 3174 and the 3299 Model 32.

Asynchronous Emulation Adapter

The Asynchronous Emulation Adapter (AEA), provides eight 15-pin connectors for attachment to ASCII displays, printers, modems, or hosts. As many as three AEAs can be installed in the controller. The AEA supports direct, switched, and nonswitched attachments of ASCII devices. It also allows:

- ASCII devices to emulate 3270 devices for communication with IBM/3270 hosts.
- 3270 devices to emulate ASCII devices for communication with ASCII hosts.
- ASCII devices to communicate with ASCII or TCP/IP hosts.

Figure 1-8 shows some possible device attachments to the Asynchronous Emulation Adapter. For more information on the AEA, see the *3174 ASCII Functions Reference* and *3174 Planning Guide*.

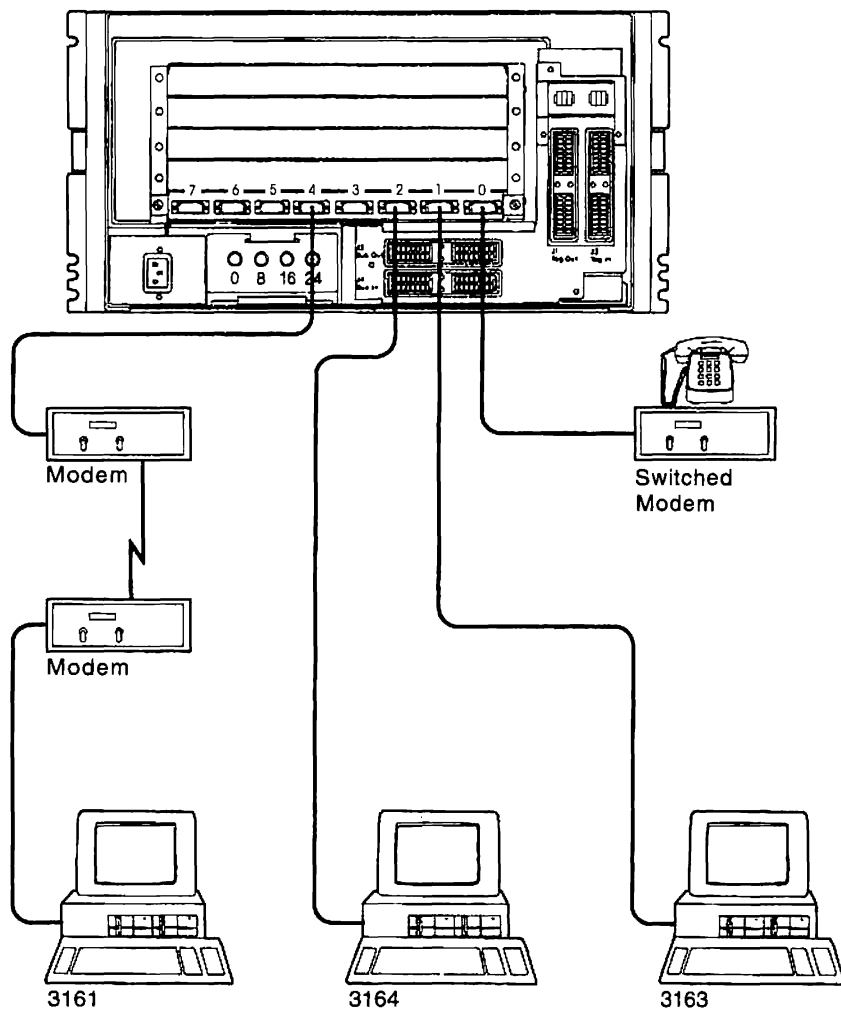


Figure 1-8. Asynchronous Emulation Adapter Device Attachments

Gateway Function

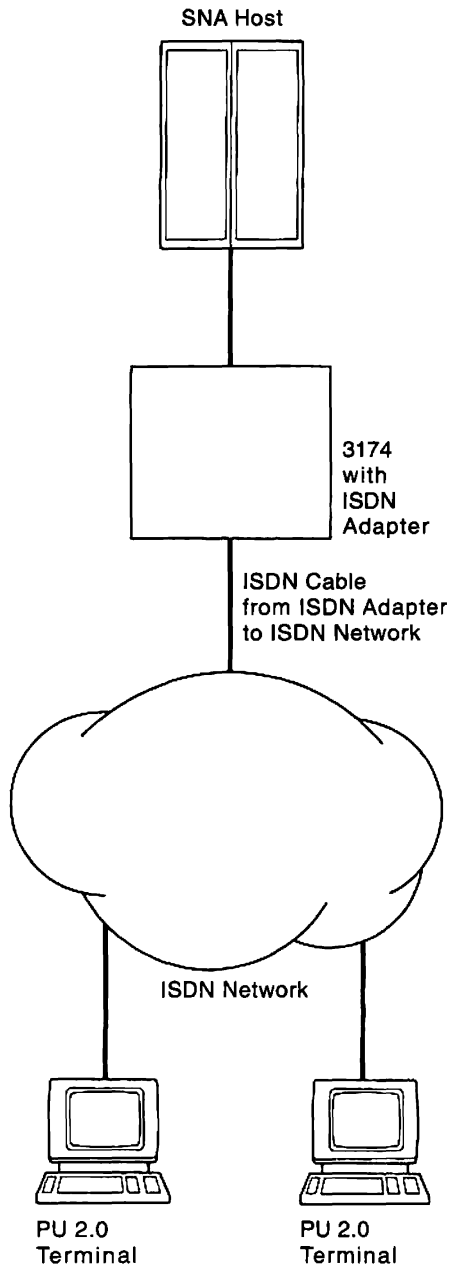
- | The 3174 can provide the gateway for devices on a LAN (Token-Ring or Ethernet) or an ISDN network.
- | The 3174 supports Token-Ring, Ethernet, and ISDN independently, and supports Token-Ring or Ethernet and ISDN concurrently. The speed at which the networks operate depends on customization and the network type.

- | LAN or ISDN devices are configured as DSPUs. These DSPUs can include other 3174s or other PU 2.0 devices. DSPUs are identified by mapping their addresses to unique host subchannel addresses or SDLC addresses reserving one subchannel address or SDLC address for the gateway controller.

- | **ISDN Gateway:** 3174s customized as ISDN gateway controllers support up to 32 devices in an ISDN Network. The network supports PS/2s and operates at speeds of 64 kbps.

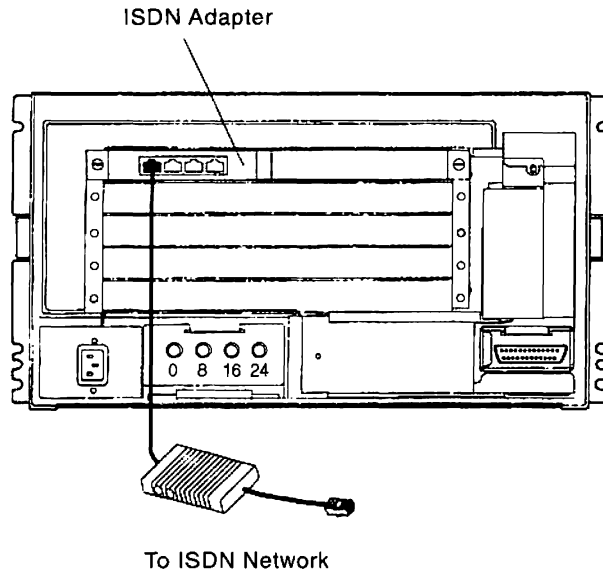
- | Through customizing, ISDN devices can access more than one host when the gateway controller is a Model 12L or 22L. See "Multi-Host Support" on page 1-18 for more information.

General Description



| *Figure 1-9. ISDN Network Connection*

- | **ISDN Adapter Connections:** Figure 1-10 on page 1-15 shows an example of an ISDN connection. In an ISDN network, the connector shown on the end of the ISDN cable connects to the Network Terminator (NT1) or a wall jack.



| *Figure 1-10. Example of an ISDN Adapter Installed on a Model 21R*

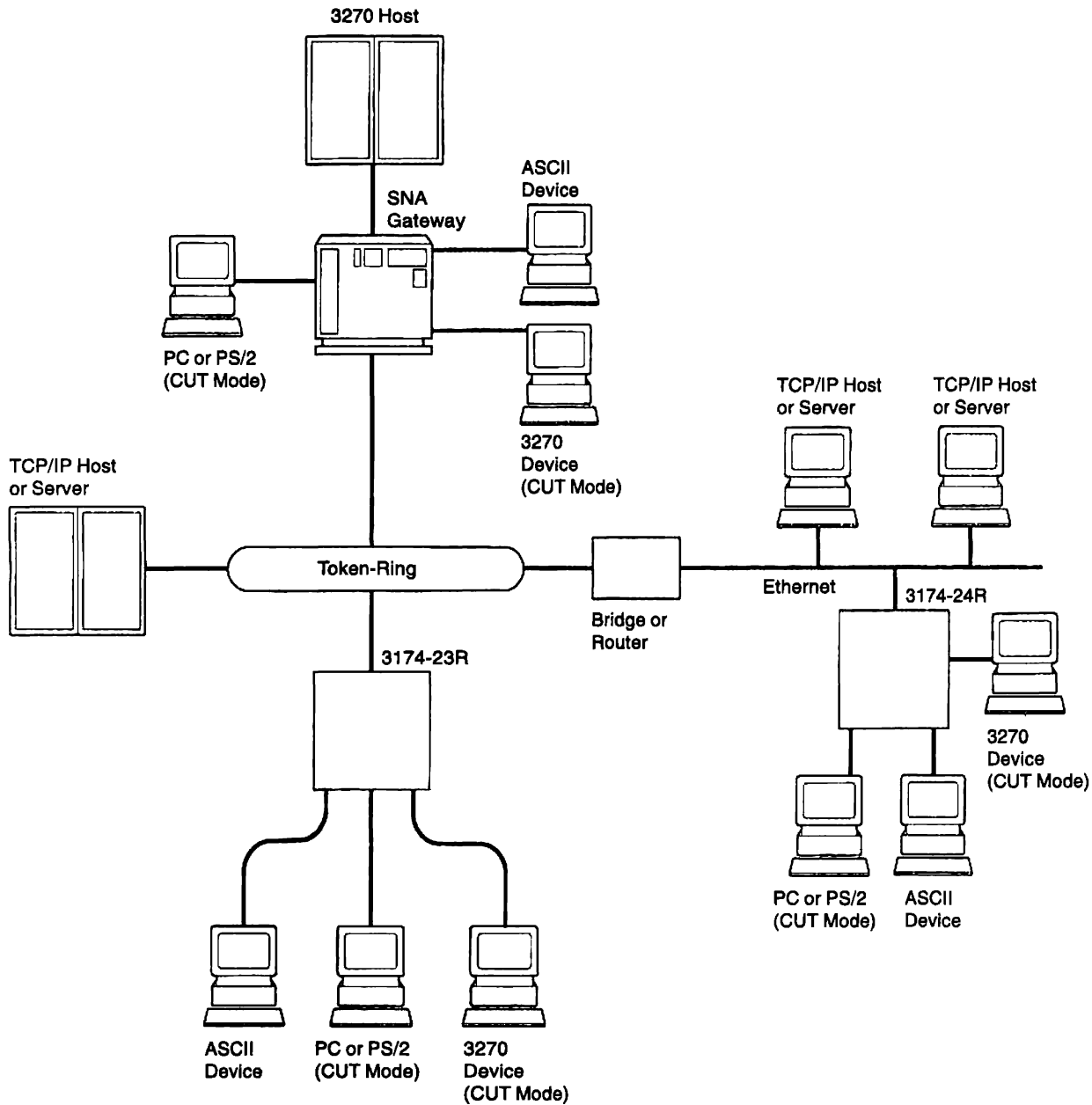
| **LAN (Token-Ring or Ethernet) Gateway:** A 3174 customized as a token-ring gateway controller supports up to 250 DSPUs.

| A 3174 customized as an Ethernet gateway controller supports up to 250 DSPUs.

| **Note:** Although a maximum of 250 DSPUs connected through a gateway is the architectural limit of either LAN adapter (Token-Ring or Ethernet), the functional limit of the LAN may be less.

| Through customizing, LAN devices can access more than one host through the controller's primary communication adapter or its CCAs.

General Description



| *Figure 1-11. An Example of a 3174 LAN Network Connection*

| **LAN Adapter Addressing:** LAN adapter addresses are 12 digits (6 bytes) in length. The customer's network administrator is responsible for preserving unique addresses for each adapter that is attaching to the LAN.

| There are two types of LAN adapter addresses:

- | • Universally administered
- | • Locally administered.

| **Universally Administered Address:** All LAN adapter cards manufactured by IBM have universally administered addresses encoded on them.

The first 2 bits in byte 0 of the address are 00 for universally administered addresses. Therefore the first address digit will be in the range of 0 through 3.

Every universally administered address is ensured unique by the Institute of Electrical and Electronic Engineers (IEEE). If the customer uses universally administered addresses, the 3174 must be reconfigured when a LAN adapter is replaced. This applies to any device on the LAN that requires replacement of its LAN adapter card. The universally administered address for the LAN adapter in the 3174 can be displayed by using the offline test for the appropriate LAN adapter. They are:

3110 = Token-ring (HG 31), function number 10

4110 = Ethernet (HG 41), function number 10

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

The first 2 bits in byte 0 of the address must be 01 for locally administered addresses. Therefore the first address digit will be in the range of 4 through 7. The local addresses format is: YYYY YYYY YYYY;

Where:

Digit X = 0100 (4) through 0111 (7)

Digits Y = remainder of customer-assigned address.

Token-Ring Attachment: The Model 23R provides for token-ring communication to an SNA host. Communication to the host is through a gateway, such as an IBM 3725 Communication Controller with the Network Control Program Token-Ring Interface (NTRI) feature, or 3174 Establishment Controller with the LAN Gateway feature, or other methods.

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

3174 Models 21L, 21R, 22L, and 22R can be alternately configured to run as a 23R. For example, a 21L can be configured on one Control Disk to operate as a 21L and another Control Disk can be configured to make the 21L operate as a 23R.

Ethernet Attachment: The Model 24R provides for Ethernet communication to an SNA host. Communication to the host is through a gateway, such as an IBM 3172 Interconnect Controller or 3174 Establishment Controller with the LAN Gateway feature, or other methods.

The 3174 Ethernet adapter serves as the attachment to the Ethernet Network.

Ethernet attachment is possible with configurations supported by the following model designations: 21L, 21R, 22L, 22R, and 24R. The Ethernet adapter is a base hardware feature with Model 24R.

The Ethernet adapter can be installed in 3174 models other than those supporting Ethernet attachment: for example, a Model 23R, which supports token-ring attachments. However, Ethernet attachment requires 3174 Configuration Support C, Release 4 or higher.

3174 Configuration Support C Release 4 or higher allows the 3174 to attach to Ethernet LANs in configurations similar to token-ring configurations supported by the same models of the 3174.

General Description

Ethernet attachment and the appropriate 3174 Configuration Support C microcode provide:

- Support for IEEE 802.3 and Ethernet Version 2 frame formats
- Ability to handle Transmission Control Protocol/Internet Protocol (TCP/IP), SNA, and Advanced Peer-to-Peer Networking* (APPN*) traffic

Ethernet Adapter Connections: The Ethernet adapter has the following connectors for connection to the Ethernet Network.

- 10BASE2 (BNC connector)
- 10BASE5 (15-pin D-SUB connector)
- 10BASE-T (RJ-45 connector)

Multi-Host Support

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

Concurrent Communication Adapter

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

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

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

Each CCA can also provide access to multiple hosts in an X.25 network. See "X.25 Single Link Multi-Host Support" on page 1-19.

Single Link Multi-Host Support

Single Link Multi-Host Support enables terminals attached to a controller to access multiple 3270 hosts on a single physical link. That link can be a primary link attaching through an Enterprise Systems Connection Adapter, Type 1 Communication Adapter (X.25 Network), a token-ring adapter, or the link can be a secondary link attaching through a Concurrent Communication Adapter (X.25 network). A terminal operator can establish a total of five sessions, in various combinations, between the terminal and these multiple hosts.

ES Connection Channel Single Link Multi-Host Support: ES* Connection Channel Single Link Multi-Host Support is a microcode function for the Model 22L. This function allows terminals attached to the controller to access multiple S/390* hosts through an Enterprise Systems Connection Channel. Up to eight hosts can be configured.

X.25 Single Link Multi-Host Support: A microcode function for controllers attached to X.25 networks. The X.25 connection can be accomplished over a primary or secondary link.

When using a primary link, up to eight hosts can be configured. The link is established using a Type 1 Communication Adapter and X.25 protocol. When using a secondary link, a maximum of four hosts can be configured. The link is established using a Type 1 or Type 2 Concurrent Communication Adapter and X.25 protocol.

Token-Ring Single Link Multi-Host Support: A microcode function for controllers attached to a token-ring network as a DSPU. It allows access to multiple hosts through gateway controllers attached to the token-ring network. Up to eight hosts can be configured for token-ring Single Link Multi-Host Support.

3174 Data Flow

There are four main buses in the controller:

- The FRU (Field Replaceable Unit) ID bus connects the processor with all cards, diskette and fixed disk drives, and the operator panel.
- The MMIO bus connects the processor with the Channel Adapter, the token-ring adapter, the Asynchronous Emulation Adapters, the Concurrent Communication Adapter, the Enterprise Systems Connection Adapter, and the ISDN Adapters.
- The PIO bus connects the processor with the Terminal Adapter, the Communication Adapter, and the File Adapter.
- The Storage bus connects the processor with the storage cards.

Figure 1-12 on page 1-20 shows the internal data flow in the Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

General Description

Planar Board

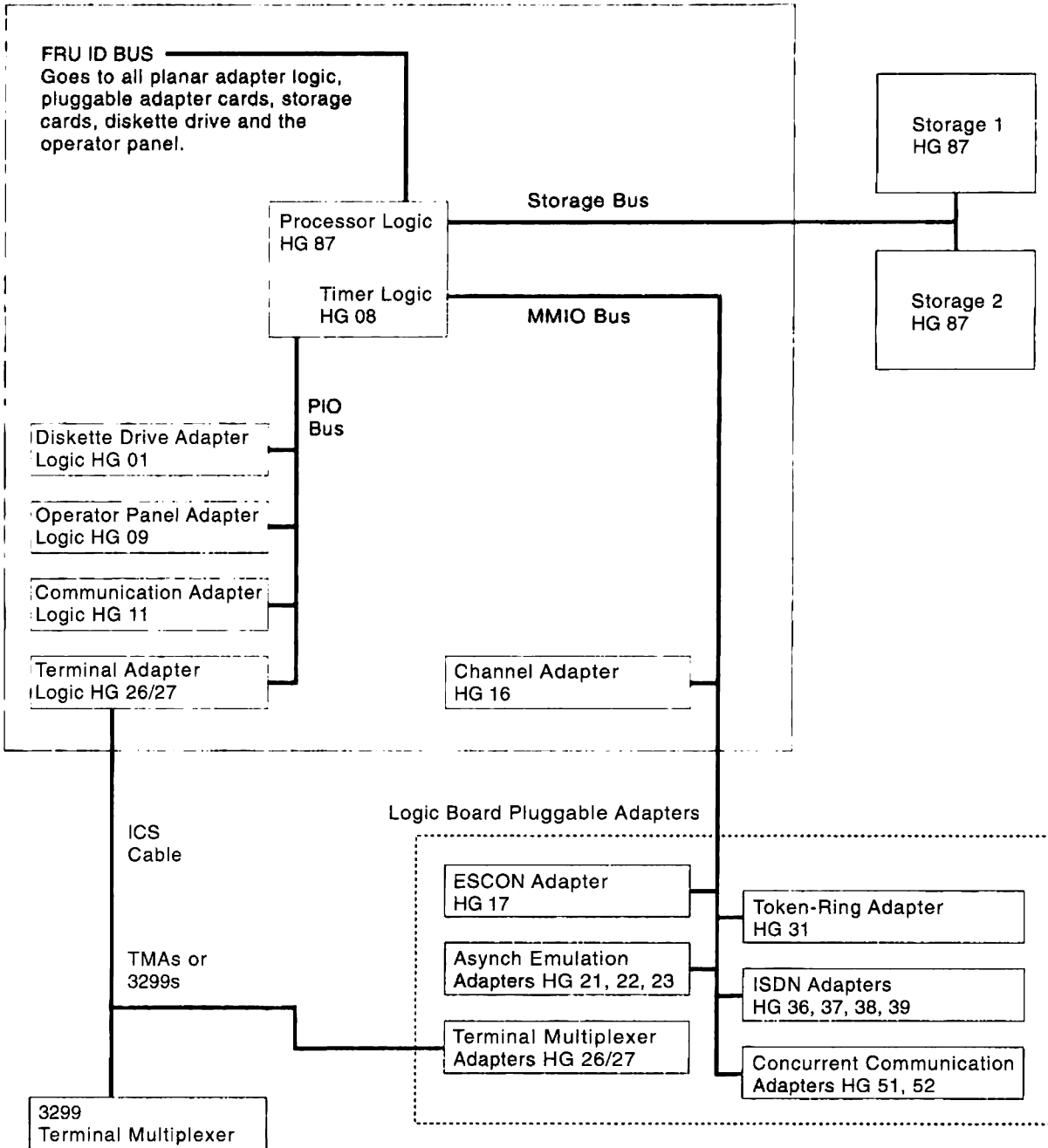


Figure 1-12. 3174 Internal Data Flow

Hardware Group and Type Numbers

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

- Hardware group numbers 01 through 52 are assigned to individual FRUs in the controller, such as adapter logic cards and diskette drives.
- Hardware group number 80 is assigned to the test monitor program.
- Hardware group 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.
- Hardware group number 87 is assigned to the processor and storage cards.

Table 1-2 lists the hardware group numbers for the Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

Table 1-2. Hardware Group Numbers

HG	Unit	HG	Unit
00	Invalid or unknown	27	Terminal Multiplexer Adapters
01	Diskette 1/File Adapter	27	Fiber Optic Terminal Adapter (FTA)
02	Diskette 2/File Adapter	31	Token-Ring Adapter
03	Fixed Disk	36	ISDN Adapter
08	Timer	37	ISDN Adapter
09	Operator Panel	38	ISDN Adapter
11	Communication Adapter	39	ISDN Adapter
16	Channel Adapter	41	Ethernet Adapter
16	Channel Driver/Receiver	46	Encrypt/Decrypt Adapter
17	Enterprise Systems Connection Adapter	51	Concurrent Communication Adapter
21	Asynchronous Emulation Adapter	52	Concurrent Communication Adapter
22	Asynchronous Emulation Adapter	80	Test Monitor
23	Asynchronous Emulation Adapter	81	Test All CSU Mode
26	Terminal Adapter	82	Test All Installed Mode
26	Terminal Multiplexer Adapters	87	Processor/Storage
26	Fiber Optic Terminal Adapter (FTA)	99	Unassigned Hardware Group
27	Terminal Adapter		

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. This section describes the FRU numbers and their functions. Table 3-1 on page 3-4 shows the associated Type Numbers and Hardware Group numbers.

3174 FRU Descriptions and Functions

The following paragraphs describe the functions of the diskette drives, fixed disk drives, the operator panel, the adapters built into the planar board, the adapter cards, the processor logic, and the storage cards.

Diskette Drives HG 01 and HG 02: The diskette drive uses a double-sided, high-density, 5.25-inch, removable diskette. The diskette drive motor is +12 V dc, direct drive (nonbelt). The +12 V dc motor is hardware-controlled and is turned on only when drive access is required. The diskette drive is packaged

General Description

for easy disconnection from the logic board. The drive interfaces with the File Adapter, through a File bus, and with the FRU ID bus. The 2.4MB diskette drive is capable of reading or writing on a 1.2MB or 2.4MB diskette.

File Adapter HG 01: The file adapter provides read/write control for the diskette drive. It interfaces with the PIO bus and the diskette drive.

Fixed Disk Drive HG 03: The fixed disk provides a formatted storage capacity of 20 megabytes. The fixed disk contains the basic electrical and mechanical components necessary to read and write data. The additional logic required to use the fixed disk is present whether the fixed disk is installed or not. The fixed disk is a field replaceable unit. The fixed disk is located to the right of diskette drive 1. The fixed disk drive is packaged for easy disconnection from the logic board.

Operator Panel HG 09: The operator panel contains the switches, indicators, and keypad (shown in Figure 1-19 on page 1-37). The operator panel plugs into the planar board. The control logic for reading the keypad switches and for writing data to the status indicators is contained on the planar board.

Type 1 Communication Adapter (Models 21R, 22L, 23R) HG 11: The Type 1 Communication Adapter provides CCITT (International Telegraph and Telephone Consultative Committee) V.24/V.28 (EIA 232D) and CCITT V.35 electrical interfaces to connect the controller to a modem or other signal converter. A 25-pin connector on the right rear of the planar board allows connection of the communication interface cable. The adapter logic is contained on the planar board. 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 an FRU ID capability to sense that the correct interface cable or wrap plug is attached. A diagnostic wrap capability is supported using the test switch on the cable or a wrap plug.

Channel Adapter (Model 21L) HG 16: The Channel Adapter provides System/370 type channel host communication. The logic for the channel interface is on the planar board. Attachment to selector, byte multiplexer, and block multiplexer channels is supported. SNA and non-SNA operational mode is selectable through customizing. When in SNA mode, the 3174 operates as a single-address controller. When in non-SNA mode, the 3174 operates as a shared multiple-address controller, using one of two address ranges: one address range is for 16 terminals, and one address range is for 32 terminals. The channel address is selectable through customizing in both SNA and non-SNA modes. The mode of data transfer to and from the channel is data-chained interlocked (DCI), high-speed transfer (HST), or data streaming. The data transfer mode is also selectable through customizing. Connection to the channel is made through the tailgate assembly that plugs into the planar board. Two types of tailgate assemblies are available; one for standard bus and tag connections and one for internal channel connectors.

Enterprise Systems Connection Adapter (Model 22L) HG 17: The Enterprise Systems Connection Adapter (ESCON* Adapter) provides ESA/390* type channel host communication through a fiber optic link. SNA and non-SNA operational modes are selectable through customizing. The channel address is selectable through customizing in both SNA and non-SNA modes. Connection to the channel is made through the duplex connector on the adapter. The adapter card interfaces with the MMIO and FRU ID buses.

Asynchronous Emulation Adapter HG 21, 22, and 23: The Asynchronous Emulation Adapter card provides eight 15-pin EIA 232D ports. It interfaces with the MMIO bus and the FRU ID bus. The adapter contains a microprocessor and storage. The adapter allows ASCII devices to communicate with ASCII hosts. It also performs protocol conversion to allow certain ASCII devices to communicate with IBM hosts, and certain 3270-type devices to communicate with ASCII hosts.

Terminal Adapter HG 26 and HG 27: The Terminal Adapter logic is on the planar board. There are two planar boards available. The base planar provides support for a maximum of thirty-two 3270-type terminals. The optional planar provides support for a maximum of sixty-four 3270-type terminals. The Terminal Adapter provides buffering and control for attachment of the maximum number of devices as specified by the planar board. Each of the four dual-purpose connectors (DPCs) on the adapter provides a path to one terminal, Fiber Optic Terminal Adapter (FTA), 3299 Terminal Multiplexer, or to Terminal Multiplexer Adapter (TMA). Signals from each port contain addressing for a maximum of eight terminals with two exceptions. The base planar board supports up to thirty-two 3270-type terminals if a 3299 Model 32 is connected to port 0 (HG 26) of the Terminal Adapter. The signals from port 0 then contain addressing for a maximum of 32 ports. Four TMAs, four 3299s, or a combination of four TMAs and 3299s can also support up to thirty-two 3270-type terminals. The optional planar supports up to sixty-four 3270-type terminals if two 3299 Model 32s are connected to the Terminal Adapter: one attached to 26-0 (HG 26) and the second attached to 27-0 (HG 27). The signals from ports 26-0 and 27-0 then contain addressing for a maximum of 32 addresses *each*. The distance between terminals or 3299s and the controller depends on the cable media being used and whether the particular terminal or 3299 requires a balun. See the *Product Information and Setup A* diagnostic wrap capability, under microcode control, is provided at the driver/receiver output of the Terminal Adapter. The Terminal Adapter interfaces with the PIO and FRU ID buses.

Terminal Multiplexer Adapter HG 26 and HG 27: The Terminal Multiplexer Adapter (TMA) cards interface with the FRU ID bus. The TMA performs the same functions as an external 3299 Model 2 Terminal Multiplexer. Input to the TMA is through a short length of RG-62A/U coaxial cable between a Terminal Adapter port and the right-most dual-purpose connector (DPC) on the TMA. The output signals from the Terminal Adapter contain addressing to select one of eight possible TMA output driver/receiver ports. The distance between terminals and the controller is the same as described for the Terminal Adapter. A diagnostic wrap capability, under microcode control, is provided at the driver/receiver output of the TMA card. The hardware group of the TMA is determined by the hardware group of the Terminal Adapter it is attached to.

Telephone Twisted-Pair Terminal Multiplexer Adapter HG 26 and HG 27: The Telephone Twisted-Pair Terminal Multiplexer Adapter (TTP TMA) cards interface with the FRU ID bus. The TTP TMA feature performs the same functions as a TMA. Input to the TTP TMA is through a short length of RG-62A/U coaxial cable between a Terminal Adapter port and the right-most dual-purpose connector (DPC) on the TMA. The output signals from the Terminal Adapter contain addressing to select one of 32 possible TMA output driver/receiver ports. Attachment to the TTP TMA feature is through a 25-pair telephone twisted-pair cable. The distance between terminals and the controller must not exceed 275 m (900 ft.).

Fiber Optic Terminal Adapter HG 26 and HG 27: The Fiber Optic Terminal Adapter (FTA) converts the optical signal from the 3299 Model 32 Terminal Multiplexer to an electrical signal for the Terminal Adapter. It converts the electrical signal from the controller to an optical signal for the 3299 Model 32. The signal connection between the FTA and the Terminal Adapter is through a short length of RG-62A/U coaxial cable between a Terminal Adapter port and the dual-purpose connector (DPC) on the FTA. Fiber optic connectors are used to provide a connection between the controller (FTA) and the 3299 Model 32. The FTA cards interface with the FRU ID bus. You can have a maximum of three FTA cards. The hardware group of the FTA is determined by the hardware group of the Terminal Adapter it is attached to.

Token-Ring Adapter HG 31: The token-ring adapter supports baseband communications at 16 or 4 Megabits per second (Mbps). The token-ring adapter provides an IEEE (ECMA 89) 802.5 interface to an IBM Token-Ring Network. The adapter interfaces to the MMIO bus and the FRU ID bus. The adapter contains a microprocessor, storage, read-only storage (ROS), and other logic to provide the physical interface, link clocking, serialization, deserialization, link address recognition, frame structuring/stripping, and error checking. A 9-pin connector is provided to attach the token-ring interface cable to the adapter.

General Description

Integrated Services Digital Network Adapter HG 36, 37, 38, and 39: The Integrated Services Digital Network Adapter card interfaces with the MMIO bus and the FRU ID bus. It provides a link between the 3174 and the ISDN network. The ISDN Adapter connects to a Network Terminator (NT1) that provides a connection to the line switching equipment. It contains a microprocessor, storage, read-only storage (ROS), and other logic to provide the physical interface, link clocking, serialization, deserialization, link address recognition, frame structuring/stripping, and error checking. The adapter card has four ports (RJ45 connectors), each supporting two connections. One connector with telephone twisted pair (TTP) wiring plugs into each ISDN Adapter port.

Ethernet Adapter HG 41: The Ethernet Network adapter card interfaces with the MMIO bus and the FRU ID bus. The adapter supports baseband communications at 10 Mbps and supports both IEEE 802.3 and Ethernet Version 2 frame formats. It can handle both TCP/IP and SNA traffic. The adapter contains a microprocessor, storage, read-only storage (ROS), and other logic to provide the physical interface, link clocking, serialization/deserialization, link address recognition, frame structuring/stripping, and error checking. Attachment to the Ethernet Network is through one of the following connectors:

- 10BASE2 BNC connector
- 10BASE5 15-pin D-SUB connector
- 10BASE-T RJ-45 connector

Type 1 Concurrent Communication Adapter HG 51 and HG 52: The Type 1 Concurrent Communication Adapter (CCA) card interfaces with the MMIO bus and the FRU ID bus. It provides a secondary communication link between the 3174 and hosts other than the primary communication link (Channel, Token-Ring, Communication, or ESCON Adapter). The Type 1 CCA 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 connector on the card allows connection of the communication interface cable. 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 an FRU ID capability to sense that the correct interface cable or wrap plug is attached. A diagnostic wrap capability is supported using the test switch on the cable or a wrap plug.

Type 2 Concurrent Communication Adapter HG 51 and HG 52: The Type 2 Concurrent Communication Adapter (CCA) card interfaces with the MMIO bus and the FRU ID bus. It provides a secondary communication link between the 3174 and hosts other than the primary communication link (Channel, Token-Ring, Communication or ESCON Adapter). The Type 2 CCA 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 connector on the card allows connection of the communication interface cable. The operational speed is selected under microcode control. External clocking is required. The adapter logic has an FRU ID capability to sense that the correct interface cable or wrap plug is attached. A diagnostic wrap capability is supported using the test switch on the cable or a wrap plug.

Planar Board: The planar board contains the controller processor, a timer, ROS module, File Adapter, Communication Adapter (Models 21R, 22L, 23R), Channel Adapter (Model 21L), Terminal Adapter, Operator Panel Adapter, and other timing and control logic. It also contains logic for single-bit per half-word storage error correction and double-bit storage error detection. A red light-emitting diode (LED) on the board 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 Cards HG 87: The storage cards contain storage and switching logic that provide usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The storage cards interface with the storage bus and the FRU ID bus. The storage cards plug directly into the planar board. They are available in four sizes:

- 1MB - Provides 1 048 576 bytes of usable storage
- 2MB - Provides 2 097 152 bytes of usable storage

- 4MB - Provides 4 194 304 bytes of usable storage
 6MB - Provides 6 291 456 bytes of usable storage.

Field Replaceable Unit Identification (FRU ID)

FRU ID modules are on the planar board, logic cards, diskette drives and fixed disk drive. During an IML, these FRUs send their FRU ID numbers to the processor logic on the planar board. The FRU ID numbers are used to build the hardware configuration table, which is written on the disk used to IML the controller. This occurs every time an IML is performed. The hardware configuration table is shown in Figure 1-13. The hardware configuration table can be displayed using Online Test 2 (see "Test 2 Configuration B/C: Configuration Menu" on page 2-172) or using the offline test monitor (see "How to Display the Test Monitor Functions (Terminal Control)" on page 2-152).

Hardware Configuration Table									
HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
01	9630	03	File Adpt						
01	9361	01	Diskette 1 - 2.4MB						
03	9365	02	Fixed Disk1 - 20MB	32XX					
08	9630	03	Timer						
09	9630	03	Ops Panel Adpt						
09	9550	07	Ops Panel Assembly						
16	9630	03	Channel Adpt						
16	9552	10	Channel Tailgate						
21	9311	11	Asynch Emul Adpt						
26	9630	03	Terminal Adpt						
26	9176	15	Term Mpx Adpt, 00-07						
31	9351	14	Token-Ring - 16MB						
51	9263	12	Tp1 Concurr. Com						
52	9267	13	Tp2 Concurr. Com						
87	9630	03	Processor						
87	9482	22	Storage 2MB						

Select Test; press ENTER ====>_

PF: 3=Quit 12=Test Menu

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

Figure 1-13. Hardware Configuration Table Example

Note: This panel shows a configuration for a Model 21L. In your 3174, only those FRUs that are physically installed appear in this table.

General Description

Status Codes

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

- Controller failures
- Communication link failures
- Microcode failures
- Operational IML progress
- Diagnostic prompt messages
- Token-Ring failures
- Prompts for procedures such as Configure, Patch, and Dump
- Attached-device failures
- Host channel failures
- Program failures
- Diagnostic IML progress
- Diagnostic progress
- Asynchronous Emulation Adapter failures
- Concurrent Communication Adapter failures
- ISDN Adapter failures.

Status codes are displayed in four formats:

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

Status Code Display Format

- | The base status code is from 1 to 4 characters. It is the first number that is displayed in the Status display, in the event log, or on the terminal. The base status code is the first number in the status code listings.
- | A status code may or may not have attributes such as a qualifier, hardware group, or extended data associated with it.
- | When 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.

How to Interpret the Status Codes Listing

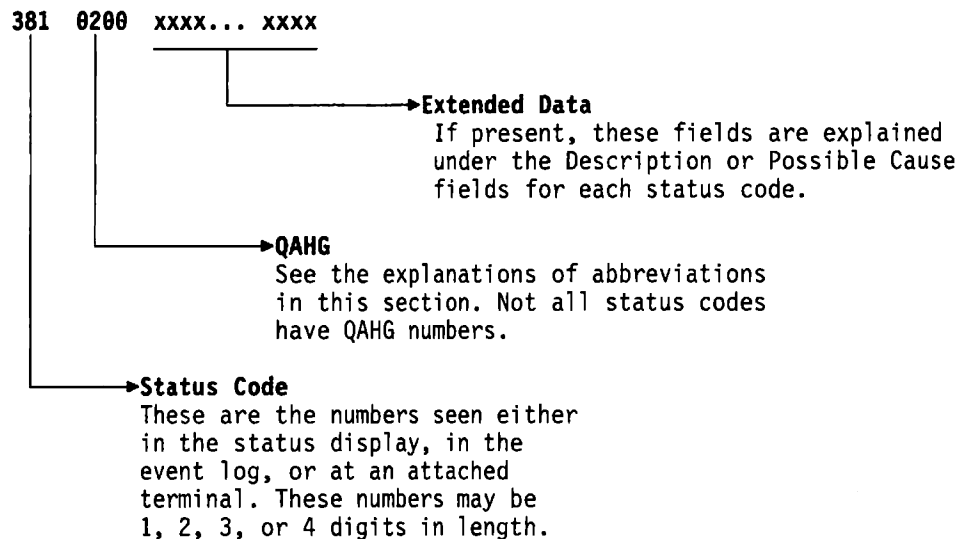
- | The status codes list uses the following abbreviations:
 - | **QA** Qualifier—A 2-digit number that immediately follows many of the status codes. The status code and the qualifier are both needed to identify a subsystem problem.
 - | **HG** Hardware Group—A 2-digit number that follows the qualifier (QA) and represents a functional area of the controller. For example, a hardware group number 01 is *diskette drive 1*.
 - | **B1B2...** Byte 1, Byte 2, and so on, of Extended Data field.
 - | **LOCA** The location of the suspected failing FRU. See "Component Locations" on page 3-2.

TYPE The type number of the suspected failing FRU. See "Type and Hardware Group Numbers" on page 3-4.

To use the status codes listed in this chapter and in the *3174 Status Codes* manual, follow these instructions:

1. Find the status code, qualifier (QA), hardware group (HG), and extended data (or additional fields) highlighted on the first line of each status code entry in the *3174 Status Codes* manual.

For example:



In the status codes list, *x* represents any number from 0 to 9.

2. Read the **Description** and **Possible Cause**. Perform the first recommended action listed under **User Action**. If that does not solve the problem, perform the next action. Continue in this way until you solve the problem or are told to request assistance or service.
3. When requesting service, be sure to give the status code number, QAHG number, and any additional numbers to the service personnel.

Operational Status Code Operator Panel Presentation

When the controller is operational, most status codes are displayed in the operator information area of the attached terminals. Some status codes are also displayed on the controller operator panel. Also, some status codes that occur when the controller is operational are temporary failures that are recoverable by the controller. Temporary failures are not displayed, 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.

The operator panel can display either a single status code or multiple status codes, up to a maximum of 10.

¹ Microcode is classified as IBM Licensed Internal Code. See the "3174 Licensed Internal Code" notice at the beginning of this document for information.

General Description

| **Single Operational Status Code:** A single operational status code is displayed on the controller operator panel constantly for 1 hour. After an hour, the panel goes blank. You can display this status code again by pressing the **Enter** key on the operator panel.

| You can display the extended data for single status codes by pressing the **Advance** key. For an example of displaying extended data for a single status code, see the example for status code 395 under "Multiple Operational Status Codes."

| **Multiple Operational Status Codes:** Multiple operational status codes that are displayed on the controller 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 395 occurs, then 3020, then 331. At the panel, 395 is displayed, followed by 3020, then 331, and then the panel goes blank. 395 is displayed again, followed by 3020, and so on. After 1 hour, the panel goes blank. You can redisplay the codes by pressing the **Enter** key on the operator panel.

| To examine these codes to see whether the code has extended data, perform the following procedure at the operator panel.

| The following codes are examples for this procedure:

| 395 0101 (QAHG) 9110 (B1B2) 2200 (B3B4)
| 3020 0101 (QAHG) 9110 (B1B2) 0100 (B3B4)
| 331 0211 (QAHG) 9253 (B1B2) 2200 (B3B4) 01 (B5)

| QA = 2-digit number that further defines status code

| HG = Hardware Group

- | 1. When 395 is displayed, press **Advance** to stop scrolling; 0101 is displayed.
- | 2. Press **Advance**; 9110 is displayed.
- | 3. Press **Advance**; 2200 is displayed.
- | 4. Press **Advance**; four blanks are displayed.
- | 5. Press **Advance**; 395 is displayed again.

| **Note:** Continue with the next step for multiple status codes, or return to Step 3 to redisplay the extended data for a single status code.

- | 6. Press **Enter** to resume automatic scrolling.
- | 7. When 3020 is displayed, press **Advance** to stop scrolling; 0101 is displayed.
- | 8. Press **Advance**; 9110 is displayed.
- | 9. Press **Advance**; 0100 is displayed.
- | 10. Press **Advance**; four blanks are displayed.
- | 11. Press **Advance**; 3020 is displayed again.
- | 12. Press **Enter** to resume automatic scrolling.
- | 13. When 331 is displayed, press **Advance** to stop scrolling; 0211 is displayed.
- | 14. Press **Advance**; 9253 is displayed.
- | 15. Press **Advance**; 2200 is displayed.
- | 16. Press **Advance**; four blanks are displayed.
- | 17. Press **Advance**; 331 is displayed again.
- | 18. 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 logical port 00, 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.

Offline Test Single-Status Code Presentation (Operator Panel): On the operator panel, when a status code occurs, the base status code is displayed. The additional fields are displayed by pressing the Advance key on the operator panel. See the example on page 1-29.

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 are examples for these procedures:

```
3001 0111 (QAHG) 9253 (TYPE) 2200 (LOCA)
3001 0101 (QAHG) 9120 (TYPE) 2100 (LOCA)
```

1. 3001 is displayed on the operator panel.
2. Press **Advance**; 0111 is displayed.
3. Press **Advance**; 9253 is displayed.
4. Press **Advance**; 2200 is displayed.
5. Press **Advance**; 4 blanks are displayed.
6. Press **Advance**; 3001 is displayed.
7. Press **Advance**; 0101 is displayed.
8. Press **Advance**; 9120 is displayed.
9. Press **Advance**; 2100 is displayed.
10. Press **Advance**; 4 blanks are displayed.
11. Press **Advance**; 4 blanks are displayed.

Note: The 8 blanks displayed in the previous steps are displayed to mark the end of the additional fields for a single status code. If more than 1 status code had occurred during the offline test, 4 blanks would have appeared at the end of each status code and 8 blanks at the end of all the status codes.

12. Press **Advance**; the first 3001 status code is displayed.

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

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

The status codes are assigned to the following categories.

0000 through 0150: This number range is used by ROS on the processor card to identify failures that occur during processor card instruction testing. These numbers appear only on the operator panel.

2xx: This number range is used to indicate permanent or temporary terminal-adaptor-attached terminal failures. These numbers appear at the attached terminals and are logged. Some temporary failures are only logged in the event log and are not displayed.

General Description

3xx: This number range is used to indicate permanent or temporary controller failures. These numbers appear on the controller operator panel and devices attached to the Terminal Adapter and/or the Asynchronous Emulation Adapter. Some temporary failures are logged in the status code event log and are not displayed.

4xx: This number range is used to indicate SNA protocol errors, data stream errors, and host software errors detected when the controller is operational. These numbers appear on terminal-adapter-attached 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 devices or on the operator panel, and are logged. Some temporary failures are only logged in the event log and are not displayed.

6xx and 7xx: This number range is used to indicate attached-device failures on distributed function terminals (DFTs), such as a 3290. These numbers appear on the attached device.

8xx: This number range is used to indicate token-ring, Ethernet, ISDN, APPN, and peer problems, ring station failures, and ring statistics, as well as problems with the AEA and the devices attached to it. Unrecoverable errors are displayed on the operator panel and logged. Temporary errors and status codes that simply provide statistics are logged in the event log and are not displayed.

1000 through 1099: This number range is assigned to the microcode bootstrap load from the diskette or fixed disk and to the extended processor card tests. These numbers appear only on the operator panel.

13xx: This number range is used by the pre-linked 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 completed successfully. These numbers appear on the operator panel. If the tests are being controlled from the terminal connected to port 0 on HG 26, 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 on HG 26, 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 on HG 26, the status codes are displayed on that terminal.

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

7xxx: This number range is used to indicate prompts, progress, and errors when customizing procedures are being performed, such as Configure, Update, and Copy. Additional fields may be presented with the base status code. These numbers appear on the terminal connected to port 0 on HG 26.

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

3174 Event Log

The 3174 provides a nonvolatile event log that is recorded on the Control diskette or fixed disk that was used to IML the controller. Most error or status conditions are logged while the 3174 is operational (online). Logging does not occur during offline procedures or tests. The log has a 15 000-byte capacity, which accommodates 300 to 1400 events. It wraps when it is full, overlaying the oldest errors. This log is reset only with online test 4, option 2. Writing of log records occurs immediately for critical faults or when a disk buffer sector of 512 bytes has been filled. Figure 1-14 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.

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

_____ Log Records - All _____

(Relative 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	0315	58	16			1A	9630	0300	01						
000	00:05	0384	05	99			1B	0387	0385							
000	00:03	0500	01	16			1C									
000	00:02	0503	01	16												
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				9482	2200							
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 1-14. Event Log (Example only)

Along with the PHG_PN, there is an associated CHG_PN, when applicable. PHG_PN represents the primary hardware group and port number (see below) associated with the logged event or failure. CHG_PN identifies the hardware group and port number (see below) to which the PHG_PN was connected at the time of the logged event or failure.

General Description

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

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

In the example shown in Figure 1-14 on page 1-31, the Relative Day/Time since the last 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 Relative Day/Time 0000/00:02. This particular IML was a power-on IML because the Relative Day/Time has been reset to zeros. At Day/Time 0015/21:07, another IML occurred. Note that the timer was not reset. This is not a power-on IML.

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

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

At time 08:11, status code 315 58 occurred on the Channel Adapter (HG 16). This indicates a controller recoverable channel parity check occurred. 9630 in the extended data is the Channel Adapter type number, and 0300 indicates the adapter is in machine location 03. The 03 indicates the adapter is running on interrupt level 01.

Note: Status code qualifiers (QA) above 50 indicate temporary conditions.

In many cases, it is necessary to determine the cause for a re-IML. This is usually the log record just before the 3174 IML status code. For example, if the 3174 at time 21:07 is an unplanned IML, the log record at time 20:01 can 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, 9482 is the card type number and 22 indicates the location of the storage card that failed.

The event log is also useful to identify terminal failures. In the example, at time 21:19, status code 201 51 was logged. One minute later, at time 21:20, status code 209 51 was logged for the same port, indicating a recoverable Terminal Adapter command queue failure occurred. Both failures occurred while the device attached to port 08 was communicating (connected) to hardware group (CHG) 16.

The 3174 also attempts to pinpoint data stream errors by logging the condition and its details for use by the system programmer. In the example, at time 21:48, status code 402 02 occurred, indicating a data stream protocol problem was detected on the terminal attached to port 02. At the time of the event, PHG 16 was communicating (connected) to a device attached to hardware group 26, port 02 (CHG_PN). The status code and the qualifier indicate that the data stream contained an invalid (out-of-range) address. The extended data gives further details about the error. The first two 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 two bytes in the extended data indicate that the invalid address was found three bytes after the command in the data stream. The third set of two 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, 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 like the example shown in Figure 1-15.

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

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

Figure 1-15. Data Stream Trace Example 1

At time 21:22, another data stream problem occurred. Status code 401 03 indicates that the terminal attached to port 02 of hardware group 26 received a data stream from the host that contained an invalid command. The extended data gives further details about the error. Because the first two bytes of the extended data are not zero, the data stream was started with a Write Structured Field (WSF) command. The value 0001 indicates that the error occurred in the first structured field in the data stream. The data in error was found to be at a displacement of four (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 like the example shown in Figure 1-16.

```
Data Stream Byte#      00          01  02      03 04 05 06
Structure Field Byte   00  01      02 03 04 05
Data                   F3          00  06      40 00 3C 40
```

```
F3  = Command = Write Structured Field
0006 = Length of the first structured field
40  = Outbound 3270 Data Stream Structured field
3C40 = Data in error (not a command)
```

Figure 1-16. Data Stream Trace Example 2

General Description

Operational status codes that are logged and are displayed on the operator panel have a slightly different format at the operator panel. Example 1 shows how a status code appears on the operator panel. Example 2 (Figure 1-18 on page 1-35) shows how the same status code appears in the event log.

Example 1 Operator Panel

331 0251 9263 1300 0100

331 is displayed on the operator panel when the failure occurs.

Press **Advance**; 0251 is displayed.

Press **Advance**; 9263 is displayed.

Press **Advance**; 1300 is displayed.

Press **Advance**; 0100 is displayed.

331 = Status code

0251 = Status code qualifier (QA) and a hardware group (HG) number

9263 = The FRU type number (TYPE)

13 = The location of the FRU (LOCA)

00 = Don't care

01 = The adapter interrupt level

00 = Don't care

Figure 1-17. Status Codes Displayed on the Operator Panel

Example 2 Event Log

Figure 1-18 shows the same status code as shown in Example 1 as it would appear in the event log.

```

_____ Log Records - All _____
(Relative Day/Time since last POR 115/13:07)
Day Time  SC   QA  PHG_PN  CHG_PN  LT  Extended data bytes (B1-B16)
          B1  B3  B5  B7  B9  B11  B13  B15
113 06:32 0331 02  51                9263 1300 0100
    
```

```

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

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

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

```

SC = Status Code = 0331
QA = Qualifier = 02
PHG_PN = Primary Hardware Group = 11 (no PN associated with PHG 11)
Extended Data:
9263 = TYPE
22   = LOCA
00   = Don't care
01   = Adapter interrupt level
00   = Don't care
    
```

Figure 1-18. Log Records Panel

General Description

Diskettes

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

- 2.4MB capacity (can also read and write on 1.2MB diskettes)
- Double-sided
- Soft-sectored
- Blank diskettes must be P/N 6109660 (1.2MB), P/N72X6086 (2.4MB), or equivalent. The part numbers are for a box of ten.

The following 3174 diskettes are available:

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

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

- CSCU
- Merge DSL
- Diagnostics
- Configure
- Define Devices
- Patch
- Identify Customizing Keyboard
- Copy Files
- Microcode Upgrade
- Merge RPQs
- Modify Keyboards
- Media Management.

Limited Function Utility Diskette: This diskette has no customizing microcode. The LFU diskette contains the microcode that supports only the following functions:

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

Control Diskette: Two Control diskettes are shipped with each machine. The Control diskette contains the operational microcode and enough diagnostic microcode to test the processor logic and storage.

Control Extension Diskette: If you are using Configuration Support C, the Control Extension diskette is used in conjunction with the Control diskette and contains microcode necessary to make the 3174 Establishment Controller operational. This microcode arrives on a 2.4MB diskette and other DSL disks must be merged onto this disk.

DSL Diskette: This is an optional diskette. It contains the microcode that supports the attachment of terminals that require downstream microcode load, such as a 3290. A specific 3174 DSL diskette contains the microcode that supports the Asynchronous Emulation Adapter. Multiple DSL diskettes are normally merged onto one DSL disk. A second diskette drive or a fixed disk drive is required in the controller to support this function.

RPQ Diskette: This is an optional diskette. It contains microcode to support special features as required by a particular customer. A maximum of 30 RPQs can be contained on one RPQ diskette. Normally, customers merge the microcode for the RPQs they are using onto one Control disk. If you are using Configuration Support C microcode, merge the RPQs onto the Control Extension diskette instead of the Control disk.

3174 Dump Diskette: This diskette is available from an IBM Parts Distribution Center as a bill of material. It contains the microcode that supports dumping the controller and distributed function terminals.

Operator Panel

The operator panel contains indicators, a keypad, function push buttons, and switches used by the IBM service representative for problem determination. See Figure 1-19 for the locations of these items and see the descriptions that follow.

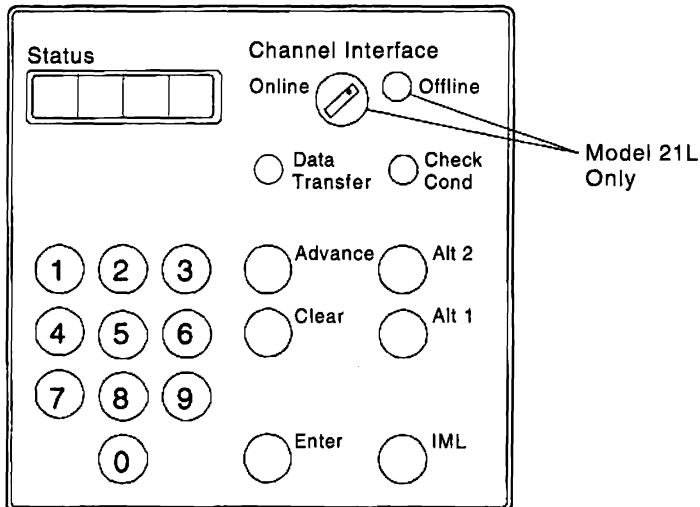


Figure 1-19. 3174 Operator Panel

Indicators

The 3174 has the following indicators:

Status. The four Status indicators display 0–9, E, H, L, P, dashes, and blanks. The displayed output can be 3174 status codes, test information, or keypad input.

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

Check Cond. When this LED turns on and remains on, it indicates that an unrecoverable controller hardware error or microcode failure has occurred.

Offline. This indicator is present only on the Model 21L. It identifies when the controller is logically connected to or disconnected from the host channel. When this indicator is on, it shows that the controller is logically disconnected. When this indicator is off, the controller is logically connected.

General Description

Keypad

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

Function Push Buttons

The operator panel contains the following function push buttons:

Advance. When you are entering or displaying more than four characters, after each group of four is displayed, pressing **Advance** allows any additional characters to be displayed. When you are entering data, after four digits are keyed in, pressing **Advance** stores the data, and the status indicators go blank. Additional digits can then be keyed in.

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

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

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

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

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

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

Channel Interface Switch (Model 21L only)

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

In the Online position, this switch logically connects the 3174 to the host channel and the Offline indicator turns off. A normal IML should not be performed if the 3174 is online to the host; channel errors might occur at the host. You should not switch the power off unless the Channel Interface switch is in the offline position.

AC Power Switch

The 2-position AC power switch is mounted on the front of the controller power supply as shown in Figure 1-20.

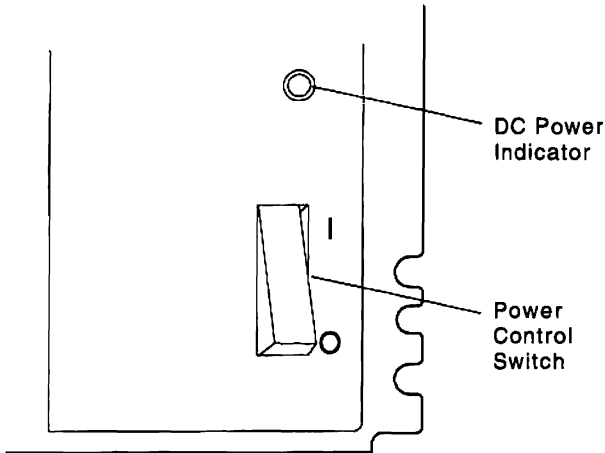


Figure 1-20. Power Switch

DC Power Indicator

The DC indicator lights when the power is switched on if the DC voltages in the power supply are within tolerance. If an incorrect voltage is sensed, the controller switches itself off.

Central Site Change Management

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

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

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

The following types of data can be distributed:

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

General Description

3174 IML Selections for CSCM

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

- Production level
- 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 a trial level of control microcode installed, they would first have to remove the back-level or delete the production level.

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

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

Alt 1 selection 41: This IML loads the production-level microcode from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure.

Alt 1 selection 42: This IML loads the back-level microcode from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure.

If a back-level version does not exist, the production version is loaded.

Alt 1 selection 43: This IML loads trial-level microcode from the fixed disk or diskette drive you specify when you perform the Alt 1 IML procedure. If a trial level does not exist, the production level is loaded.

If you are running Alt 1 selections 41, 42, or 43 with Configuration Support C, Control microcode and the Control Extension diskette are required.

A NetView DM operator at a central site terminal can also perform these IMLs.

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

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. You start a normal IML by turning on the controller or by pressing the **IML** push button after the controller is turned on. IML occurs from the first fixed disk with Control microcode or the first diskette drive that has a Control diskette installed. The IML device selection order is the fixed disk, then diskette drive 1, then diskette drive 2. If a failure or unusual status condition occurs during any portion of the IML sequence, a status code is displayed and remains on the 3174 operator panel. For a Model 21L, if the Channel Interface switch is in the Online position and the channel interface indicator is off, the connection to the channel is established when the IML is completed. Other models attempt to establish the connection with the host when the IML is completed. During a normal IML initiated from the IML push button, the following tests run:

- | 1. Processor card ROS tests
- | 2. File Adapter pretest
- | 3. Storage

| During a normal IML initiated from a power-on, the following tests run:

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

Alt 1 Normal IML Description

An Alt 1 normal IML is used to load operational microcode from a specific diskette or fixed disk drive. A configured Control diskette must be installed in the diskette drive that is selected as the IML drive. If you are running Configuration Support C, both a Control disk and a Control Extension diskette are required. If your 3174 has a fixed disk drive, the configured diskette can be copied onto the fixed disk. During an Alt 1 Normal IML, the following tests run:

- 1. Processor read only storage (ROS) tests
- 2. First storage card
- 3. File Adapter pretest
- 4. Extended tests load from the diskette or fixed disk
- 5. Extended processor tests
- 6. Remainder of storage.

Alt 1 Normal IML Procedure: To perform an Alt 1 Normal IML select the IML device and storage option (DS) and Function Selection (FS). See Table 1-3 on page 1-42.

Where:

DS = 12 - Diskette 2 with storage initialization

FS = 41 - Normal IML

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

General Description

Table 1-3. Alt 1 IML Device, Function, and Parameter Selections

<p>DS = IML device selection</p> <ul style="list-style-type: none">= 01 = Diskette drive 1 without storage initialization= 02 = Diskette drive 2 without storage initialization= 03 = Fixed disk without storage initialization= 08 = Auto IML device selection without storage initialization (Note 4)= 11 = Diskette drive 1 with storage initialization= 12 = Diskette drive 2 with storage initialization= 13 = Fixed disk with storage initialization= 18 = Auto IML device selection with storage initialization (Note 4)
<p>FS = Function selection</p> <ul style="list-style-type: none">= 40 = Display Master Menu at port 0 on HG 26= 41 = Normal IML= 42 = Access Host Back level changes= 43 = Access Host Trial level changes= 44 = Reserved= 45 = Reserved= 80 = Load test control monitor= 81 = Test All (CSU mode)= 82 = Test All (Installed mode) (same as Alt 2 IML)= 87 = Test Processor and Storage
<p>TP = Test Parameter (used only with 8x function selections)</p> <ul style="list-style-type: none">= 90 = No Options - Default= 91 = Loop= 92 = Stop on error= 93 = Loop, stop on error= 94 = Terminal control= 95 = Loop, terminal control= 96 = Stop on error, terminal control= 97 = Loop, stop on error, terminal control

Notes:

1. If an IML device (DS) is not entered, ROS defaults to DS = 01.
2. If no input parameters are entered (Enter pressed without any data), ROS defaults to DSFS = 0140.
3. If storage initialization is bypassed, ROS bypasses the tests for the File Adapter.
4. Auto IML device selection causes ROS to try to load operational microcode from each IML device. Device search order is the fixed disk, then diskette drive 1, and then diskette drive 2.
5. Test function 80, 81, 82, or 87 can be selected in response to the 40 prompt message. You select individual tests only after selecting an 8x function first and obtaining the 4001 prompt message.
6. Test function 81 has special setup requirements necessary to complete successfully. For details, see "Test All 81 (CSU)" on page 2-97.
7. Test function 82 can be performed at any time after the controller has been installed.

Alt 2 IML Procedures (Test 82)

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

- If on a diskette, use "Procedure A – Test 82"
- If on a fixed disk, use "Procedure B – Test 82" on page 1-44.

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

1. Processor read only storage (ROS) tests
2. First storage card test
3. File Adapter pretest
4. Extended processor instruction tests (HG 87)
5. Additional storage (HG 87)
6. File Adapter tests (HG 01)
7. Fixed disk and diskette drive tests (HG 03, 01, 02)
8. Extended timer tests (HG 08)
9. Communication Adapter tests (no wrap tests) (HG 11)
10. Channel Adapter tests (no wrap tests) (HG 16)
11. Enterprise Systems Connection Adapter (no wrap tests) (HG 17)
12. Asynchronous Emulation Adapter (no wrap tests) (HG 21, 22, and 23)
13. Terminal Adapter tests (no wrap tests) (HG 26 and HG 27)
14. Token-Ring Adapter tests (no wrap tests) (HG 31)
15. ISDN adapter tests (HG 36, 37, 38, and 39)
16. Ethernet Adapter tests (no wrap tests) (HG 41)
17. Concurrent Communication Adapter tests (no wrap tests) (HG 51 and 52).

Most errors that occur during an Alt 2 IML do not stop the test unless a critical failure occurs, such as a diskette drive problem. Errors are stored in the test error log and are displayed at the end of the test for analysis. An Alt 2 IML runs up to eight minutes. When 2082 appears in the display, the test has completed successfully.

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

Procedure A – Test 82

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

1. Have the host operator take the controller offline.
2. (Model 21L only) Set the Channel Interface switch to Offline. Wait for the offline indicator to light.
3. Insert a Utility diskette into diskette drive 1. If the controller has two diskette drives, insert a Control or DSL diskette into drive 2.
4. Press and hold **Alt 2**.
5. Press and release **IML**.
6. Release **Alt 2**.

Progress numbers appear in the Status display of the operator panel as the test runs for several minutes. If the test runs successfully, 2082 appears in the Status display. If the test stops with a number other than 2082, refer to *3174 Status Codes*.

General Description

Procedure B – Test 82

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

1. Have the host operator take the controller offline.
2. (Model 21L only) Set the Channel Interface switch to Offline. Wait for the offline indicator to light.
3. Insert the Control diskette into drive 1.
4. Press and hold **Alt 1**.
5. Press and release **IML**.
6. Release **Alt 1**.
7. At 40, key in **0382**;

Where:

03 = Access the Utility microcode on the Fixed Disk.

82 = Load and run the Alt 2 tests.

8. Press **Enter**.

Progress numbers appear in the Status display of the operator panel as the test runs for several minutes. If the test runs successfully, 2082 appears in the Status display. If the test stops with a number other than 2082, refer to *3174 Status Codes*.

Environmental Restrictions

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

Environmental Classifications:

- Pollutants classification = P1
- Gaseous classification = G1
- Vibration classification = V4
- Shock classification = S1
- Temperature and relative humidity classification = C.

3174 Temperature and Humidity Limits:

- Operational temperature range is from 10° C (50° F) to 40° C (104° F)
- Operational relative humidity range is from 8% to 80%
- Operational wet bulb is 27° C (80.6° F).

3174 Acoustics: The maximum allowable 3174 adjusted decibels output is 5.9 Dba.

Special Tools

The following tools are available for wrap tests on the Communication Adapter, Concurrent Communication Adapter, ISDN Adapter, Enterprise Systems Connection Adapter, Channel Adapter, Token-Ring Adapter, and Asynchronous Emulation Adapter in the 3174 Establishment Controller. These tools are available from the branch office or through normal parts distribution:

6423419	EIA/V.35 wrap plug (Type 1 Communication Adapter and Concurrent Communication Adapter)
6423420	X.21 wrap plug (Type 2 Concurrent Communication Adapter)
6165899	Token-ring adapter wrap plug
74F4409	ISDN Adapter wrap plug and coupler
39F6853	Asynchronous Emulation Adapter wrap plug (15-pin)
61X4602	Asynchronous Emulation Adapter cable wrap plug (25-pin)
6246339	Channel wrap block (bus) standard channel connector
4299873	Channel wrap block (tag) standard channel connector
53F7816	Channel wrap plug (internal channel connector)
6473048	Terminator (internal channel connector)
5605670	Enterprise Systems Connection Adapter wrap plug.

For details about using wrap plugs to test a particular adapter, see:

- “How to Run Communication Adapter Optional Tests” on page 2-117 for the communication adapter wrap plugs.
- “How to Run the Channel Driver/Receiver Wrap Test (FN 01)” on page 2-123 for the channel adapter wrap blocks.
- “How to Run Token-Ring Adapter Optional Tests” on page 2-142 for the token-ring adapter wrap plug.
- “How to Run Ethernet Adapter Optional Tests” on page 2-149 for the Ethernet adapter wrap plugs.
- “How to Run ISDN Adapter Optional Tests” on page 2-145 for the ISDN Adapter wrap plug and coupler.
- “How to Run Asynchronous Emulation Adapter Optional Tests” on page 2-130 for the asynchronous emulation adapter wrap plug.
- “How to Run the Enterprise Systems Connection Wrap Test (FN 01)” on page 2-128 for the Enterprise Systems Connection Adapter wrap plug.

Special Tools

Table 1-4 (Page 1 of 3). Wrap Plugs

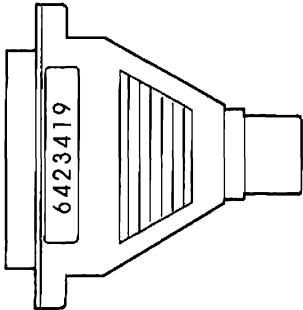
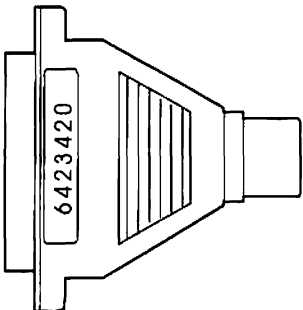
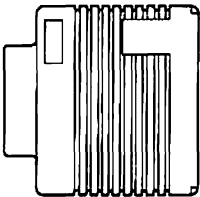
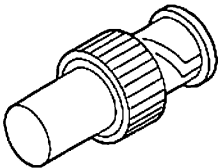
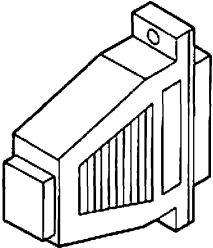
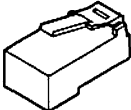
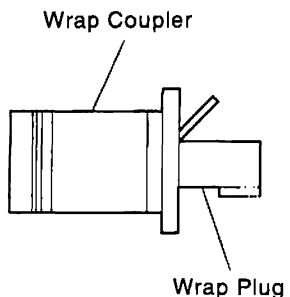
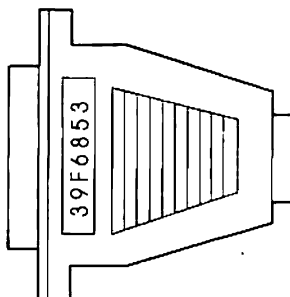
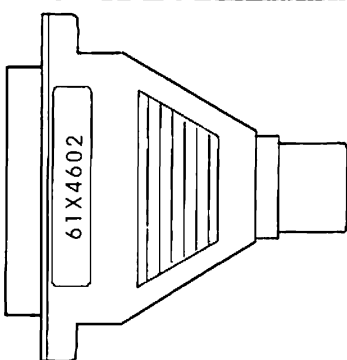
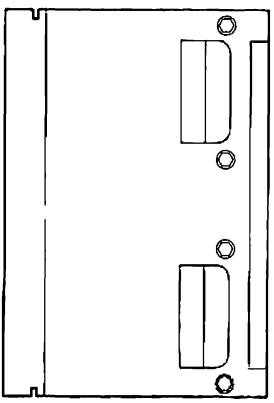
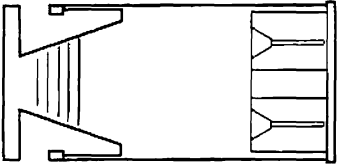
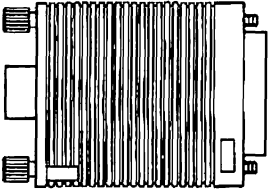
Type	Part Number	Description	
EIA 232D/CCITT V.24/V.28 or CCITT V.35	6423419	Used to test the Type 1 Communication Adapter on the Models 21R, 22L, and 23R and the Type 1 Concurrent Communication Adapter. It can be connected directly to the adapter card.	
CCITT X.21	6423420	Used to test the Type 2 Concurrent Communication Adapter. Can be connected directly to the adapter card.	
Token-ring adapter	6165899	Used to test the token-ring adapter. This wrap plug is connected directly to the adapter card.	
Ethernet Adapter Wrap Plug - 10BASE2	60G3980	Used to test an Ethernet adapter using a 10BASE2 connection. This wrap plug is connected to the BNC connector.	An illustration of this wrap plug follows.
Ethernet Adapter Wrap Plug - 10BASE-T	60G3981	Used to test an Ethernet adapter using a 10BASE-T connection. This wrap plug is connected to the RJ45 connector.	An illustration of this wrap plug follows.
Ethernet Adapter Wrap Plug - 10BASE5	71F1167	Used to test an Ethernet adapter using a 10BASE5 connection. This wrap plug is connected to the 15-pin D-SUB connector.	An illustration of this wrap plug follows.
			<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Wrap Plug for 10BASE2 BNC Connections</p> </div> <div style="text-align: center;">  <p>Wrap Plug for 10BASE5 15-pin D-SUB Connections</p> </div> <div style="text-align: center;">  <p>Wrap Plug for 10BASE-T RJ-45 Connections</p> </div> </div>

Table 1-4 (Page 2 of 3). Wrap Plugs

Type	Part Number	Description	
ISDN Adapter	74F4409	Used to test the ISDN port and cable.	 <p>Wrap Coupler</p> <p>Wrap Plug</p>
AEA (15 pin)	39F6853	Used to test the Asynchronous Emulation Adapter port. To wrap the modem end of the Asynchronous Emulation Adapter cable, use the 25-pin wrap plug (P/N 61X4602)	 <p>39F6853</p>
AEA (25 pin)	61X4602	Used to test the Asynchronous Emulation Adapter port and cable. This wrap plug is connected to the AEA cable.	 <p>61X4602</p>
Channel Wrap Blocks: Tag In Bus In	4299873 6246339	Used to test the driver/receiver circuitry at the bus and tag connectors on the tailgate assembly in the controller. Wrap blocks are normally installed in the controller when the test is performed. However, they can be attached to the end of the Tag In and Bus In channel cables to test the cables.	 <p>Tag In Wrap Block (PN 4299873) Bus In Wrap Block (PN 6246339)</p>

Special Tools

<i>Table 1-4 (Page 3 of 3). Wrap Plugs</i>			
Type	Part Number	Description	
Enterprise Systems Connection Adapter Wrap Plug	5605670	Used to test the data path from the Enterprise Systems Connection Adapter during the Enterprise Systems Connection wrap test.	
Channel Wrap Plug	53F7816	Used to test the driver/receiver circuitry at the tailgate assembly during the channel driver/receiver wrap test.	
Channel Terminator	6473048	The internal channel terminator is not shown. Only one wrap block is needed with the internal channel cable connectors.	

Chapter 2. Diagnostic Information

Introduction	2-3
Start MAPs	2-3
Initial Symptom Chart	2-3
MAP 0100: Check Cond Indicator Is On with Blank Status Indicators	2-5
MAP 0110: Operator Panel Isolation	2-7
MAP 0120: Status Code Not Indicated or Known	2-9
MAP 0200: 3270-Type Terminal Problem Entry	2-10
MAP 0210: All 3270-Type Terminals are Failing	2-11
MAP 0220: One or More Failing 3270-Type Terminals	2-16
MAP 0230: 3299 Model 32 and the Fiber Optic Terminal Adapter	2-20
MAP 0300: Telecommunication Failures	2-26
MAP 0420: Status Code 8888 Displayed	2-30
MAP 0430: File Adapter or Drive Failures	2-32
MAP 0500: IML Stops at 8888	2-34
MAP 0600: MMIO Bus Failure	2-35
MAP 0610: Token-Ring Failures	2-36
MAP 0620: ISDN Failures	2-39
MAP 0630: Ethernet Failures	2-45
MAP 0710: Power Load Isolation	2-47
MAP 0800: FRU ID Bus Isolation	2-49
MAP 0900: Channel Problems	2-51
MAP 0910: Online/Offline Channel Problem (Model 21L)	2-52
MAP 0920: Local Channel 3174 Isolation	2-54
MAP 0930: Enterprise Systems Connection Adapter Problems	2-58
MAP 1000: ASCII Problem Entry	2-60
MAP 1010: All ASCII Ports Are Failing	2-64
MAP 1020: Direct Attached Ports—Any Failure	2-66
MAP 1030: Leased Line (nonswitched) Port—Any Failure	2-73
MAP 1040: Switched Line Port—Any Failure	2-80
MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host	2-94
Diagnostic Aids: Offline Tests	2-96
Hardware Group Test Alls and Processor/Storage Tests	2-96
Test All 81 (CSU)	2-97
Test All 82 (Alt 2 IML)	2-97
Test All 87	2-97
Hardware Group Basic Tests	2-97
Hardware Group Optional Tests	2-98
Test Request Format	2-98
How to Load the Test Monitor	2-102
Loading the Test Monitor from a Diskette	2-102
Loading the Test Monitor from a Fixed Disk	2-102
Terminal Control Test Menus	2-103
How to Run Hardware Group Test Alls or Processor/Storage Test	2-105
How to Run Hardware Group Basic Tests	2-106
How to Run Diskette Drive Optional Tests	2-108
Diskette Drive Ready/Change Test (FN 01)	2-108
Diskette Drive Media Scan (FN 02)	2-109
How to Run Fixed Disk Drive Optional Tests	2-110
Fixed Disk Surface Scan (FN 31)	2-110
Fixed Disk Defect Fix (FN 32)	2-110

Fixed Disk Drive Full Format (FN 33)	2-111
Display Fixed Disk Defect Table (FN 34)	2-112
CSU Surface Scan (FN 51)	2-114
Write Bootstrap Loader (FN 52)	2-114
How to Read and Set the Timer	2-115
How to Read the Timer (FN 01)	2-115
How to Set the Timer (FN 02)	2-115
How to Run the Operator Panel Test	2-116
How to Run Communication Adapter Optional Tests	2-117
Communication Adapter Function Number Descriptions	2-118
How to Run the Channel Driver/Receiver Wrap Test (FN 01)	2-123
Wrap Test Analysis	2-124
How to Run the Channel Online, Offline Switch Indicator Test (FN 02)	2-128
How to Run Enterprise Systems Connection Adapter Tests	2-128
How to Run the Enterprise Systems Connection Wrap Test (FN 01)	2-128
How to Run the Send Offline Sequence Test (FN 02)	2-129
How to Run Asynchronous Emulation Adapter Optional Tests	2-130
Asynchronous Emulation Adapter Port Driver/Receiver Wrap (FN 01)	2-130
Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring	2-130
CCITT V.24/V.28 or EIA 232D Cabling to a DTE	2-130
CCITT V.24/V.28 or EIA 232D Cabling to a DCE	2-135
Creating a Null Modem	2-137
How to Run Terminal Adapter/TMA/FTA/3299 Optional Tests	2-139
Terminal Adapter Function Number Descriptions	2-140
How to Run Token-Ring Adapter Optional Tests	2-142
Token-Ring Adapter Function Numbers	2-143
Token-Ring Adapter Replacement Considerations	2-143
How to Run ISDN Adapter Optional Tests	2-145
ISDN Wrap Plug and Cable Wiring	2-147
How to Run Ethernet Adapter Optional Tests	2-149
Ethernet Adapter Replacement Considerations	2-150
How to Display the Test Log	2-150
Test Log Function Number Descriptions	2-151
How to Display the Test Monitor Functions (Terminal Control)	2-152
Test Monitor Function Number Descriptions	2-152
Online Tests—Configuration B and C	2-154

Introduction

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

Start MAPs

Initial Symptom Chart: Start at the top of the following chart and find your symptom. Then take the action specified for that symptom. In the MAPs and the *3174 Status Codes* manual, multiple FRUs might be listed for replacement for certain failures. The replacement strategy is to swap each FRU one at a time until the machine stops failing. The most likely FRU is always listed first.

Symptom Explanation	Action
DC Power indicator is off.	Go to "MAP 0710: Power Load Isolation" on page 2-47.
IML stops with 8888 in status display	Go to "MAP 0500: IML Stops at 8888" on page 2-34.
Status code or alternating codes.	Go to the <i>3174 Status Codes</i> manual. If the code is not found in the <i>3174 Status Codes</i> manual, go to "MAP 0110: Operator Panel Isolation" on page 2-7. If multiple status codes are displayed, see "Multiple Operational Status Codes" on page 1-28.
Status code not indicated or known.	Go to "MAP 0120: Status Code Not Indicated or Known" on page 2-9.
Check Cond indicator is on with blank Status indicators.	Go to "MAP 0100: Check Cond Indicator Is On with Blank Status Indicators" on page 2-5.
Operator panel failures.	Go to "MAP 0110: Operator Panel Isolation" on page 2-7.
3270 terminal or printer failing.	Go to "MAP 0200: 3270-Type Terminal Problem Entry" on page 2-10.
ASCII host/terminal/printer failing.	Go to "MAP 1000: ASCII Problem Entry" on page 2-60.
Token-ring network attachment problems.	Go to "MAP 0610: Token-Ring Failures" on page 2-36.
ISDN network attachment problems	Go to "MAP 0620: ISDN Failures" on page 2-39.
Ethernet network attachment problems.	Go to "MAP 0630: Ethernet Failures" on page 2-45.
All problems between the host/channel and the 3174.	Go to "MAP 0900: Channel Problems" on page 2-51.
ES Connection Channel (Model 22L) failures.	Go to "MAP 0930: Enterprise Systems Connection Adapter Problems" on page 2-58
All problems between the remote host and 3174. Type 1 or Type 2 (HG11, HG51 or HG52) communication adapter failures.	Go to "MAP 0300: Telecommunication Failures" on page 2-26.
The IML fails to start only after power is switched on.	This failure can display a blank, 8888, or any other code. Exchange the power supply. Be sure to use the same type/part number for your replacement.
Fans are not turning.	Check that the fan assemblies are properly installed. Repair or exchange as needed. Exchange the power supply. Exchange the planar board.
Logic board socket pins are bent or broken.	Visually inspect the affected board sockets for bent or broken pins. Repair or replace the logic board as required. See "Logic Board Removal/Replacement" on page 3-19.

Introduction

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See “How to Take the 3174 Model 21L Offline” on page 2-290 or “How to Take the 3174 Model 22L Offline” on page 2-291.

Warning: Do not place any electrical or mechanical equipment on top of a 3174 Establishment Controller. Electrical or magnetic interference can cause intermittent problems in the 3174.

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

Symptom Explanation	Conditions That Could Cause This Symptom
The Check Cond indicator is on, indicating a pending status code or a failing 3174.	<ul style="list-style-type: none"> • A 3174 status code is pending. • The planar board is failing. • The operator panel is failing. • The microcode has a failure. • One of the attached devices or cables may be causing the 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.)

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

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

Are the status indicators blank (no numbers or letters)?

Yes No

002

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

003

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

Is 8888 displayed?

Yes No

004

- This problem may be caused by a device that is connected to the 3174. Disconnect the cables to the devices to see if you can isolate the failure.
- Replace the operator panel.
- Replace the planar board.

005

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Was the Alt 2 IML successful (2082 displayed)?

Yes No

006

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

007

(Step 007 continues)

MAP 0100 (continued)

007 (continued)

Is the Check Cond indicator off?

Yes No

008

- Exchange the planar board.
- If the failure continues, use your support structure for aid.

009

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-41.

Was the IML successful?

Yes No

010

- Replace the power supply.

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

011

- Return the 3174 to the customer.
-

MAP 0110: Operator Panel Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The operator panel is failing in one or more of its functions.	<ul style="list-style-type: none"> Defective operator panel. Defective planar board. Interaction from other hardware failure. Go to Step 003 to isolate the problem.

CAUTION:

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

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

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

Is 8888 displayed?

Yes No

|
|
|
|
|
|
|

002

- Replace the operator panel.
- Replace the planar board.

003

– Load the Test monitor.

– See "How to Load the Test Monitor" on page 2-102. Return here and continue with this MAP.

Is 4001 displayed?

Yes No

|
|
|
|
|

004

- Replace the operator panel.
- Replace the planar board.

005

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

Is 4505 displayed?

Yes No

|
|
|
|
|

006

- Replace the operator panel.
- Replace the planar board.

007

(Step **007** continues)

MAP 0110 (continued)

007 (continued)

- Press the following operator panel keys, and verify that the expected characters are in the status indicators.

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

Did the correct characters display?

Yes No

008

- Replace the operator panel.
- Replace the planar board.

009

- Press any number key (0–9), and check the following indicators on the operator panel:

The Check Cond indicator (red) goes off.

Then the Data Transfer indicator (green) goes on for about two seconds.

Then about five seconds later the Check Cond indicator (red) goes on.

- Press the **Enter** key.

Is 2009 displayed?

Yes No

010

- Replace the operator panel.
- Replace the planar board.

011

- Press the **Enter** key to end the test.
- Perform a normal IML. See “Normal Initial Microcode Load (IML)” on page 1-41.

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

MAP 0120: Status Code Not Indicated or Known

Symptom Explanation	Conditions That Could Cause This Symptom
Status code is not displayed on the 3174 Operator panel or is not known.	<ul style="list-style-type: none">• Status code is displayed on a terminal.• Status code is stored in the 3174; use Test 1 Event Log.

001

Try to obtain a status code by taking the following actions:

- Press **Enter** on the 3174 operator panel.
- Check a failing terminal.
- At a working 3278 (or equivalent display) attached to this controller, use Online Test 1, Option 2. See the online test section for the appropriate configuration level.

Did you find a status code?

Yes No

002

Continue with the next symptom in the "Initial Symptom Chart" on page 2-3.

003

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

MAP 0200: 3270-Type Terminal Problem Entry

Symptom Explanation	Action
Status code 3233 or 399 09.	Go to step 003 of "MAP 0220: One or More Failing 3270-Type Terminals" on page 2-16.
All attached devices are failing.	Go to "MAP 0210: All 3270-Type Terminals are Failing" on page 2-11.
One or more attached devices are failing.	Go to "MAP 0220: One or More Failing 3270-Type Terminals" on page 2-16.

MAP 0210: All 3270-Type Terminals are Failing

Symptom Explanation	Conditions That Could Cause This Symptom
All devices attached to a Terminal Adapter are failing.	<ul style="list-style-type: none"> • Defective planar board • Defective Terminal Multiplexer Adapter • Defective 3299 Terminal Multiplexer • Defective Fiber Optic Terminal Adapter • Defective cable media • Multiple device problems • No AC power to the 3299 • Defective cable between the TA and TMA, 3299, or FTA • Incorrectly connected cables.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Is there more than one failing terminal attached to the 3174?

Yes No

004

– Go to Step 006 on page 2-12.

005

– Go to Step 008 on page 2-12.

MAP 0210 (continued)

006

(From step 004)

Is the single terminal attached through a TMA or a 3299?

Yes No

007

– Go to Step 013.

008

(From step 005)

Are all of the terminals connected to the same TMA or 3299?

Yes No

009

– Replace the planar board and verify the fix.

010

– Check for a loose or defective cable from the TA to the TMA, FTA, or 3299. If using coaxial cable, see “How to Perform the Coaxial Cable Ground Loop Check” on page 2-293 to verify if the cable was defective. If using the IBM Cabling System (ICS), go to *Using the IBM Cabling System with Communication Products, GA27-3620*.

Was the cable loose or defective?

Yes No

011

– Go to Step 018 on page 2-13.

012

– Reconnect or replace the cable and verify the fix.

013

(From step 007)

– Disconnect the terminal cable from the TA and run the TA port wrap test. Load the Test Monitor. See “How to Load the Test Monitor” on page 2-102.
– At 4001, key in **2601** or **2701** and press **Advance**.
– Key in the TA port number (00, 08, 16, or 24), to which the terminal was connected, and press **Enter**.

Is 2026 or 2027 displayed?

Yes No

014

– Go to Step 025 on page 2-13.

015

– Reconnect the terminal cable to the TA and run the terminal path test. Ensure that power is switched on at the terminal being tested.
– If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the Diagnostic Monitor. See “How to Load the Test Monitor” on page 2-102.

(Step 015 continues)

015 (continued)

- At 4001, key in **2603** or **2703** and press **Advance**.
- Key in the TA port number of the failing terminal (00, 08, 16, or 24), then press **Enter**.

Is 4550 displayed?

Yes No

016

- Go to Step 036 on page 2-15.

017

The problem is in the terminal.

018

(From step 011)

- If the terminals are connected through a 3299, verify that the 3299 is powered on.

Is the 3299 powered on or are the terminals connected to a TMA?

Yes No

019

- Connect power to the 3299 and verify the fix.

020

- Disconnect the cable from the TA to the TMA, FTA, or 3299 and run the TA wrap test. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-102.
- At 4001, key in **2601** or **2701** and press **Advance**.
- Key in the port TA number, (00, 08, 16, or 24), to which the TMA, FTA, or 3299 was connected, and press **Enter**.

Is 2026 or 2027 displayed?

Yes No

021

- Go to Step 025.

022

Are the terminals connected to a 3299 Model 1?

Yes No

023

- Go to Step 028 on page 2-14.

024

- Replace the 3299 Model 1 and verify the fix.
-

025

(From steps 014 and 021)

(Step **025** continues)

MAP 0210 (continued)

025 (continued)

Is 3040 displayed?

Yes No

026

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

027

- Replace the planar board.
 - Reconnect any disconnected cables.
 - Verify the fix.
-

028

(From step 023)

- Reconnect the cable from the TA to the TMA, FTA, or 3299.
- Disconnect all of the output cables from the TMA or 3299.
- Run the TMA or 3299 wrap test.
- If the 4001 prompt is not displayed, press **Enter**. If 4001 is not displayed, see “How to Load the Test Monitor” on page 2-102.
- At 4001, key in **2606** or **2706** and press **Advance**.
- Key in the TA port number that the TMA, FTA, or 3299 is attached to (00, 08, 16, or 24), and press **Enter**.

Is 2026 or 2027 displayed?

Yes No

029

- Go to Step 031.

030

- Check cables from the TMA or 3299 to the terminals. If using coaxial cable, see “How to Perform the Coaxial Cable Ground Loop Check” on page 2-293. If using the IBM Cabling System (ICS), go to *Using the IBM Cabling System with Communication Products, GA27-3620*.
-

031

(From step 029)

Is 3040 displayed?

Yes No

032

- Use the *3174 Status Codes* manual to find the repair action for the status code displayed.

033

(Step 033 continues)

033 (continued)

Are the terminals attached through a 3299 Model 32 that is connected through an FTA using fiber optic cable?

Yes No

034

- Replace the TMA or 3299 and verify the fix.

035

- Go to "MAP 0230: 3299 Model 32 and the Fiber Optic Terminal Adapter" on page 2-20.

036

(From step 016)

Is 3041 displayed?

Yes No

037

- Use the *3174 Status Codes* manual to find the repair action for the status code displayed.

038

The problem is the terminal or the cable connecting the terminal to the 3174.

MAP 0220: One or More Failing 3270-Type Terminals

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal failing.	<ul style="list-style-type: none"> • Defective planar board • Defective Terminal Multiplexer Adapter • Defective 3299 Terminal Multiplexer • Defective Fiber Optic Terminal Adapter • Defective coaxial or fiber optic cable • Multiple device problems • Defective terminal • No AC power to the 3299 • Defective cable between the TA and TMA, 3299, or FTA • Incorrectly connected cables.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

Are all the failing terminals connected to the same TA port?

Yes No

002

– Replace the planar board and verify the fix.

003

– Check for a loose or defective cable from the TA to the TMA, FTA, or 3299, or the terminal.

Was a cable loose or defective?

Yes No

004

– Go to Step 006.

005

– Reconnect or replace the defective cable and verify the fix.

006

(From step 004)

- Disconnect the cable from the TA and run the port wrap on that port.
- Load the Test Monitor. See "How to Load the Test Monitor" on page 2-102.
- At 4001, key in **2601** or **2701** and press **Advance**.

(Step **006** continues)

006 (continued)

– Key in the TA port number that the cable was connected to (00, 08, 16, or 24) and press **Enter**.

Is 2026 or 2027 displayed?

Yes No

007

– Go to Step 013.

008

Is the failing terminal connected directly to the TA?

Yes No

009

– Go to Step 019 on page 2-18.

010

– Reconnect the terminal cable to the TA and run the Terminal Path test.

Note: Make sure that power is switched on at the terminal being tested.

– If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the Diagnostic Monitor. See “How to Load the Test Monitor” on page 2-102.

– At 4001, key in **2603** or **2703** and press **Advance**.

– Key in the TA port number TA (00, 08, 16, or 24), to which the terminal is connected, and press **Enter**.

Is 4050 displayed?

Yes No

011

– Go to Step 016 on page 2-18.

012

The problem is in the terminal.

013

(From step 007)

Is 3040 displayed?

Yes No

014

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

015

– Replace the planar board

– Reconnect any cables that are disconnected.

– Verify the fix.

MAP 0220 (continued)

016

(From step 011)

Is 3041 displayed?

Yes No

017

- Use the status code that is displayed and look up the repair action in the *3174 Status Codes* manual.

018

- The problem is the terminal or the cable connecting the terminal to the TA. If using coaxial cable, see "How to Perform the Coaxial Cable Ground Loop Check" on page 2-293 to verify if the cable is defective. If using the IBM Cabling System (ICS), go to *Using the IBM Cabling System with Communication Products, GA27-3620*.
-

019

(From step 009)

- If the terminals are connected through a 3299, verify that the 3299 is powered on.

Is the 3299 powered on or are the terminals connected through a TMA?

Yes No

020

- Connect power to the 3299 and verify the fix.

021

Are the terminals connected to a 3299 Model 1?

Yes No

022

- Go to Step 024.

023

- Replace the 3299 Model 1 and verify the fix.
-

024

(From step 022)

- Reconnect the cable from the TA to the TMA, FTA, or 3299.
- Disconnect all of the output cables from the TMA or 3299.
- Run the TMA or 3299 wrap test.
- If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, See "How to Load the Test Monitor" on page 2-102.
- At 4001, key in **2606** or **2706** and press **Advance**.
- Key in the TA port number that the TMA, FTA, or 3299 was connected to (00, 08, 16, or 24) and press **Enter**.

(Step **024** continues)

024 (continued)

Is 2026 or 2027 displayed?

Yes No

025

– Go to Step 027.

026

– Check the cables from the TMA or 3299 to the terminals. If using coaxial cable, see “How to Perform the Coaxial Cable Ground Loop Check” on page 2-293. If using the IBM Cabling System (ICS), go to *Using the IBM Cabling System with Communication Products*, GA27-3620.

027

(From step 025)

Is 3040 displayed?

Yes No

028

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

029

Are the terminals attached through a 3299 Model 32 that is connected through an FTA using fiber optic cable?

Yes No

030

– Replace the TMA or 3299 and verify the fix.

031

Go to “MAP 0230: 3299 Model 32 and the Fiber Optic Terminal Adapter” on page 2-20.

MAP 0230: 3299 Model 32 and the Fiber Optic Terminal Adapter

Symptom Explanation	Conditions That Could Cause This Symptom
A terminal attached to a 3299 Model 32 is failing.	<ul style="list-style-type: none"> • Defective Fiber Optic Terminal Adapter • Fiber Optic cable defective or incorrectly connected • Defective 3299 Terminal Multiplexer • No AC power to the 3299 • 3299 input and output cables connected incorrectly • Defective signal cable to Fiber Optic Terminal Adapter • Attached device failing • Attached device signal cable failing • Multiple device problems • Defective planar board.

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*.)

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

Are all the 3299 attached devices failing?

Yes No



003

– Disconnect the fiber optic cable at the Fiber Optic Terminal Adapter.

Are both yellow Fiber Optic Terminal Adapter lights on?

Yes No



005

– Connect the fiber optic short jumper wrap cable to the two fiber optic connectors on the Fiber Optic Terminal Adapter.

(Step 005 continues)

005 (continued)

Did the FTA Receive Light (L1) turn off? See Figure 2-1 on page 2-22.

Yes No

006

- Replace the Fiber Optic Terminal Adapter card.

007

- Remove the fiber optic short jumper wrap cable from the FTA.
- Reconnect the fiber optic cable to the FTA.
- At the 3299, remove the fiber optic cable.

Are both yellow 3299 lights on?

Yes No

008

- Go to Step 012 on page 2-23.

009

- Connect the fiber optic short jumper wrap cable to the two fiber optic connectors on the 3299.

Did the 3299 Receive light (L3) turn off? See Figure 2-1 on page 2-22.

Yes No

010

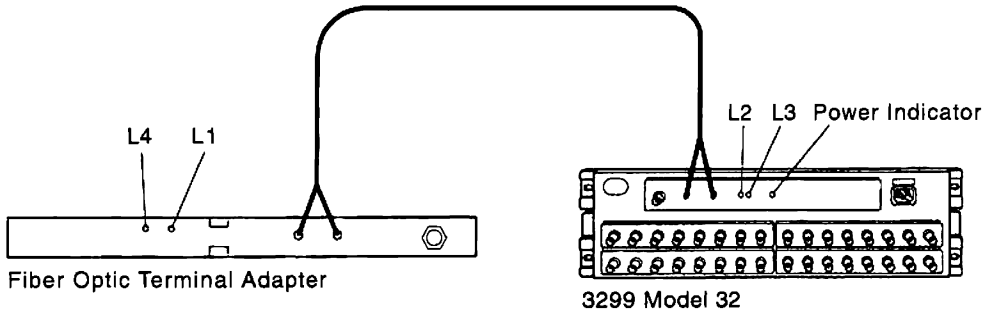
- Replace the 3299.

011

(From step 023)

- Remove the fiber optic short jumper wrap cable from the 3299.
 - Reconnect the fiber optic cable to the 3299.
 - Disconnect all of the output cables from the 3299.
 - Run the Multiplexer Wrap All offline test with the loop option.
 - If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the Diagnostic Monitor. See "How to Load the Test Monitor" on page 2-102.
 - Key in **2691** or **2791** and press **Advance**.
 - Key in **06** and the TA port number that the FTA was attached to (00, 08,16, or 24), and press **Enter**.
 - See Figure 2-1 on page 2-22 and Table 2-1 on page 2-22 and proceed as directed.
-

MAP 0230 (continued)



Where:

L1 = FTA Transmit - On: No data being transferred from the FTA
Off: Data being transferred from the FTA

L2 = 3299 Receive - On: No signal being received at the 3299
Off: Signal being received at the 3299

L3 = 3299 Transmit - On: No data being transferred from the 3299
Off: Data being transferred from the 3299

L4 = FTA Receive - On: No signal being received at the FTA
Off: Signal being received at the FTA.

Figure 2-1. Using the LEDs on the FTA and 3299-32 for Problem Determination

Notes:

1. During normal operation, all lights should be off.
2. During Testing/Utility operation, when Auto Polling stops, L1 and L3 turn on for lack of data (polling).
3. The 3299 wrap test must be running in "Loop" mode to use the following table.

Compare the LEDs on the 3299 Model 32 and the FTA with Table 2-1. Starting with the first item in the lists in the Action column, replace the parts and verify the fix.

Table 2-1. Using the LEDs on the FTA and 3299-32 for Problem Determination

LEDs Status				
L1	L2	L3	L4	Action
On Steady	—	—	—	1. FTA 2. Coaxial cable from the TA to the FTA 3. Planar Board.
Off or Blinking	On Steady	—	—	Go to Step 024 on page 2-24.
Off or Blinking	Off or Blinking	On Steady	—	Replace the 3299 and verify the fix.
Off or Blinking	Off or Blinking	Off or Blinking	On Steady	1. Fiber Optic cable between the FTA and the 3299 2. 3299 3. FTA.
Off or Blinking	Off or Blinking	Off or Blinking	Off or Blinking	1. 3299 2. FTA 3. Planar Board.

012

(From step 008)

Is the 3299 power indicator light on?

Yes No



013

- Go to Step 015.

014

- Replace the 3299.

015

(From step 013)

- Verify that the power cord is inserted in the 3299 and is plugged into a working outlet.

Is the 3299 power indicator on?

Yes No



016

- Replace the 3299.

017

Did both 3299 yellow lights come on?

Yes No



018

- Replace the 3299.

019

- Connect the fiber optic short jumper wrap cable to the fiber optic connectors on the 3299.

Did the 3299 Receive light (L3) turn off? See Figure 2-1 on page 2-22.

Yes No



020

- Replace the 3299.

021

- Disconnect the fiber optic short jumper wrap cable from the 3299.

- Reconnect the fiber optic cables to the 3299.

Does the failure still occur?

Yes No



022

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.

023

(Step 023 continues)

MAP 0230 (continued)

023 (continued)

- Go to Step 011 on page 2-21.
-

024

(From page 2-22)

- Reverse the fiber optic connectors at the FTA and see if the status of the LEDs changes.

Did the LEDs change?

Yes No

025

- Starting with the first item in the list, replace the part and verify the fix:
 1. Fiber optic cable between the FTA and the 3299
 2. FTA
 3. 3299.

026

- Follow the actions listed in Table 2-1 on page 2-22 for the new LED status indication.
-

027

(From step 002)

- Run the wrap test to each failing 3299 port.
- Disconnect the cable from the 3299 to the terminal for the ports to be tested.
- If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the Diagnostic Monitor. See “How to Load the Test Monitor” on page 2-102.
- Key in **2602** or **2702** and press **Advance**.
- Key in the logical port number of the device and press **Enter**.

Note: The port number is the 3299 port number (00-31) plus the TA port number (00, 08, 16, or 24).

Is 2026 or 2027 displayed?

Yes No

028

The 3299 is defective; it must be replaced.

029

- Reconnect the terminal cable to the 3299 and run the Terminal Path test.

Note: Make sure that power is switched on at the terminal being tested.

- If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the Diagnostic Monitor. See “How to Load the Test Monitor” on page 2-102.
- At 4001, key in **2603** or **2703** and press **Advance**.
- Key in the logical port number to which the terminal is connected and press **Enter**.

Note: The port number is the 3299 port number (00–31) plus the TA port number (00, 08, 16, or 24).

Is 4050 displayed?

Yes No

030

(Step 030 continues)

- 030 (continued)
– Go to Step 032.

031

The problem is in the terminal.

032

(From step 030)

Is 3041 displayed?

Yes No

033

- Use the status code that is displayed and look up the repair action in the *3174 Status Codes* manual.

034

- The problem is the terminal or the cable connecting the terminal to the 3299. If using coaxial cable, see “How to Perform the Coaxial Cable Ground Loop Check” on page 2-293 to verify if the cable is defective. If using the IBM Cabling System (ICS), go to *Using the IBM Cabling System with Communication Products, GA27-3620*.
-

MAP 0300: Telecommunication Failures

Symptom Explanation	Conditions That Could Cause This Symptom
3174 Controller with a Type 1 Communication Adapter or Type 1 or Type 2 Concurrent Communication Adapter not communicating with the host.	<ul style="list-style-type: none"> • Customizing response is incorrect • No AC power to modem • Defective modem cable • Incorrect modem cable • Improperly installed modem cable • Defective modem • Defective planar board • Defective Concurrent Communication Adapters (HG 51 and HG 52) • Communication link failure.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off.

001

– Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Did the problem occur after the 3174 had been working?

Yes No

004

- Use Online Test 2, Option 2, to verify that the customizing response numbers are correct for your 3174 options and host link attachment. See “Test 2 Configuration B/C: Configuration Menu” on page 2-172.
- Continue with Step 005.

005

(From step 004)

(Step 005 continues)

005 (continued)

Is the attachment a CCITT V.35 interface? Determine by checking the communication interface cable part number. See Chapter 6 for part numbers.

Yes No

006

- Set the communication cable TEST/OPER switches to TEST. Go to ENTRY POINT A in Step 007.

007

- Disconnect the cable from the modem.
- Set the switches to Test Mode 1 as shown in Table 2-8 on page 2-119 and Figure 2-7 on page 2-119.
(ENTRY POINT A)
- Disconnect the cable from the modem if not already disconnected.
- Display the 4001 prompt, see "How to Load the Test Monitor" on page 2-102.
- Run the cable wrap test; key in **HG01** (HG=11, 51, or 52) and press **Enter**.

Is 20HG displayed?

Yes No

008

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

02HG (cable or wrap plug not connected)

- Check that the modem cable or wrap plug is plugged into the 3174 Communication Adapter.
- Check that the modem cable is the correct part number. See Chapter 6 for part numbers.
- For HG 11, replace the planar board. For HG 51 or 52, replace the Concurrent Communication Adapter card.

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

- Check that the cable is not an EIA232D or CCITT V.35 part number. See Chapter 6 for part numbers.
- Replace the Concurrent Communication Adapter card.
- Replace the X.21 cable.

2XHG (cable wrap failure; the planar board (HG 11), the Concurrent Communication Adapter card (HG 51 or 52), modem cable, or wrap plug is defective, or the modem cable or wrap plug part number being used is incorrect).

- Go to *3174 Status Codes*. Look up code 3030 2XHG and see if the 2x code is a cable or wrap plug part number compatibility problem. See Chapter 6 for part numbers.
- If you want to isolate the problem to the **card** or **cable**, run the wrap test with the wrap plug. For wrap plug part numbers, see Figures 2-8 through 2-10 on pages 2-120, 2-121, and 2-122.
- Install the card wrap plug, and run the wrap test as previously done in step 007.

009

(Step 009 continues)

MAP 0300 (continued)

009 (continued)

Is the interface EIA 232D/CCITT V.35?

Yes No

010

– Go to Step 020 on page 2-29.

011

- For V.35, repeat the wrap test again in test mode 2. See Table 2-8 on page 2-119.
- Reconnect the communication cable to the modem.
- Set the communication cable TEST/OPER switches back to OPER.
- To run the modem status test, key in **HG04** and press **Enter**.

Is 4513 displayed?

Yes No

012

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

4510 (missing Data Set Ready and Carrier Detect)

- The status test shows that the modem or its connections are causing the problem.
- Check the communication cable for proper continuity when the TEST/OPER switch is in the OPER position. See Figure 2-8 on page 2-120, Figure 2-9 on page 2-121, Figure 2-10 on page 2-122.

4511 (missing Carrier Detect and Data Set Ready is active).

Verify whether your link should be providing the Carrier Detect signal.

- Go to ENTRY POINT B of this MAP.

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 of this MAP.

013

The Communication Adapter is receiving Data Set Ready and your link is providing the Carrier Detect signal.

(ENTRY POINT B)

Is the attachment to an IBM modem?

Yes No

014

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

015

(Step 015 continues)

015 (continued)

Is the modem wrappable?

Yes No

016

The modem or the communication link is causing the problem.

017

- The TEST/OPER switches are still set to OPER.
- Run the modem wrap test with the modem clock; key in **HG02** (HG=11, 51, or 52) and press **Enter**.

Is 20HG displayed?

Yes No

018

Status Code 3030

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

Note: Do not run the test with the modem set to External Speed Control. The 3174 modem wrap test shows a defective modem.

019

- The modem is functioning correctly.

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

- Verify the operational status of the communication network.
-

020

(From step 010)

- Make sure the TEST/OPER switch is still set to TEST.
- Display the 4001 prompt, see "How to Load the Test Monitor" on page 2-102.
- Run the cable wrap test using the modem clock; key in **HG05** (HG=11, 51, or 52) and press Enter.

Is 20HG displayed?

Yes No

021

The modem or its connections are causing the problem.

022

- The wrap testing indicates that the 3174 is functioning correctly and was able to run using the modem clock signal.
 - Verify the operational status of the communication network and the other modem signals.
 - Verify the communication cable for proper continuity when the switch is in the operate position.
 - Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.
-

MAP 0420: Status Code 8888 Displayed

Symptom Explanation	Conditions That Could Cause This Symptom
The status code 8888 displayed.	<ul style="list-style-type: none">• Any logic card in locations 11 to 15• Tailgate assembly• Defective planar board.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

- Switch power off.
- Unseat all the logic cards in locations 11 to 15.
- Switch power on.

Is status code 8888 off?

Yes No

002

- Reseat all the unseated logic cards and go to Step 006.

003

- Switch power off.
- Reseat one of the cards that was unseated.
- Switch power on.

Does status code 8888 come on?

Yes No

004

- Repeat the preceding actions for the remaining cards.

005

- Replace the card that caused status code 8888 to turn on.
 - Test the controller and return it to the customer.
-

006

Note: You must disconnect the channel cables before you remove the tailgate assembly.

- Have the host operator stop the system.
- Remove the channel cables.
- Unseat the tailgate assembly.
- Switch power on.

(Step 006 continues)

006 (continued)

Is status code 8888 still on?

Yes No

007

- Replace the tailgate assembly.
- Reconnect the channel cables.
- Have the host operator restart the system.

008

- Replace the planar board. Reconnect the tailgate assembly and the channel connectors.
 - Test the controller and return it to the customer.
-

MAP 0430: File Adapter or Drive Failures

Symptom Explanation	Conditions That Could Cause This Symptom
A diskette or fixed disk drive appears to be failing	<ul style="list-style-type: none">• Diskette Media failure• Diskette Drives (location 01 or 02) defective• Fixed Disk Drive (location 02) defective• Planar board• Storage cards defective.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

Is the failing drive a diskette drive? (HG 01 or 02)

Yes No

002

- Place the Utility diskette in drive 1.
- Perform a basic test on the fixed disk drive (HG03). See "Hardware Group Basic Tests" on page 2-97.
- If the test completes with a status code of 2003 or 2903, go to Step 004 on page 2-33.
- If the status code is other than 20HG or 29HG, use the *3174 Status Codes* manual for the repair action.

003

- Exchange the diskette in the drive indicated by the HG number.
 - Exchange the FRU indicated by TYPE and LOCA in the customer-reported status code and test again.
 - If the failure continues and two diskette drives are present, exchange the other drive with the one just removed in the previous step and test again.
 - Exchange the planar board.
 - Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-41.
-

004

(From step 002)

- Perform the Fixed Disk Defect Fix test. See "Fixed Disk Defect Fix (FN 32)" on page 2-110.

Is 4408 displayed?

Yes No

005

- Use *3174 Status Codes* to find the repair action.
- If the failure continues, exchange the planar board.

006

No new defects were found. This may be an intermittent problem.

- Replace the fixed disk drive. See the warning in Step 005.
 - Exchange the planar board.
 - Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-41.
-

MAP 0500: IML Stops at 8888

Symptom Explanation	Conditions That Could Cause This Symptom
8888 displayed in status indicator.	<ul style="list-style-type: none">• Defective power supply• Defective planar board• IML key sticking• System reset is being held active.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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

Is the DC indicator on?

Yes No

Yes
No

002

– Go to “MAP 0710: Power Load Isolation” on page 2-47.

003

– Go to “MAP 0420: Status Code 8888 Displayed” on page 2-30.

MAP 0600: MMIO Bus Failure

Symptom Explanation	Conditions That Could Cause This Symptom
Status Code 3002 is caused by a MMIO Bus interface problem detected during the testing of any card plugged into locations 11 through 15 or the planar.	<ul style="list-style-type: none"> Defective card in Locations 11 through 15 Planar board.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

- Switch the controller power off.
- Unseat all the cards in locations 11 through 15.
- Switch the controller power to On.
- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 3002 displayed?

Yes No

002

- One of the cards that was unseated is causing the error. Switch the controller power off, then reseat one card. Switch power on, perform the Alt 2 IML, and check for status code 3002. Repeat until the defective card is found.

003

Replace the planar board.

MAP 0610: Token-Ring Failures

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or symptom is indicating a token-ring network communication problem.	<ul style="list-style-type: none"> Defective token-ring adapter card Defective token-ring communication cable Improper customizing responses IBM Token-Ring Network.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Did the problem occur after the 3174 had been working?

Yes No

004

– Use Online Test 2, Option 2, to verify that the customizing response numbers are correct for your token-ring attachment. See "Test 2 Configuration B/C: Configuration Menu" on page 2-172.

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

005

– Verify that the 3174 token-ring communication cable is plugged into a complete token-ring network configuration.

– To display the 4001 prompt, see "How to Load the Test Monitor" on page 2-102.

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

– Key in **3101** and press **Enter**.

(Step **005** continues)

005 (continued)

Is 2031 displayed?

Yes No

006

If status code 2931 or 3050 is displayed, go to Step 012 on page 2-38.

For any other status code, see *3174 Status Codes*.

007

Warning: Run the wrap test HG (31) Function (02) only with the wrap plug installed.

A wrap plug (P/N 6165899) is needed to completely test the token-ring adapter.

Do you have the wrap plug?

Yes No

008

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-41
- Use Online Test 9 to display the token-ring adapter test menu. From this menu, you can check the status of the ring, link, or adapter card. See "Test 9 Configuration B/C: Token-Ring and LAN Tests" on page 2-213.
- Check for any status codes in the Event Log that pertain to the token-ring (HG31), run Test 1 Event Log (Option 2). See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166.
- If you find problems with the IBM Token-Ring, see the *IBM Token-Ring Network Problem Determination Guide*.
- Replace the token-ring adapter card.

009

- Install the wrap plug into the socket on the token-ring adapter card.
- To display the 4001 prompt, see "How to Load the Test Monitor" on page 2-102. If you ran the tests in the preceding steps, you can obtain the 4001 prompt by pressing **Enter**.
- Key in **3102** and press **Enter**.

Is 2031 displayed?

Yes No

010

If status code 2931 or 3050 is displayed:

- Check the wrap plug for bent or broken pins.
- Replace the token-ring adapter card.

For any other status code, see *3174 Status Codes*.

011

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-41.
 - Use Online test 9 to display the token-ring adapter test menu. From this menu you can check the status of the ring, link, or adapter card. See "Test 9 Configuration B/C: Token-Ring and LAN Tests" on page 2-213.
 - Check for any status codes in the event log that pertain to the token-ring (HG31). Run Test 1 Event Log (Option 2). See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166.
 - If you find problems with the IBM Token-Ring Network, see the *IBM Token-Ring Network Problem Determination Guide*.
-

MAP 0610 (continued)

012

(From step 006)

- Leave the 3174 token-ring cable connected to the adapter card and disconnect the other end of the cable.

The disconnected cable plug shorts the transmit-to-receive lines to allow the wrapped data to return to the token-ring adapter card.

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

Is 2931 or 3050 displayed?

Yes No

013

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

014

- If you want to isolate the failure to the card or cable, run the wrap test with the wrap plug (P/N 6165899).
 - Disconnect the cable from the token-ring adapter card and insert the wrap plug.
 - Press **Enter**. 4001 appears. Key in 3101 to run the wrap test again.
 - If the wrap test is successful (2031), the communication cable is defective.
 - If the wrap test fails, (2931 or 3050) replace the token-ring adapter card.
-

MAP 0620: ISDN Failures

Symptom Explanation	Conditions That Could Cause This Symptom
The 3174 is not communicating over the ISDN Network.	<ul style="list-style-type: none"> • Defective ISDN Adapter card. • Defective ISDN cable. • Improper customizing responses. • ISDN Network is inoperative. • Defective terminal or DSPU.

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*.)

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

Is the 3174 operational?

Yes No

002

– Go to Step 009 on page 2-40.

003

– At a working 3270-type terminal use Online Test 16, Option 1 to determine the failing ISDN ports. See "Test 16 Configuration C (Only): ISDN Adapter Tests" on page 2-258.

Are all ports on an ISDN Adapter failing?

Yes No

004

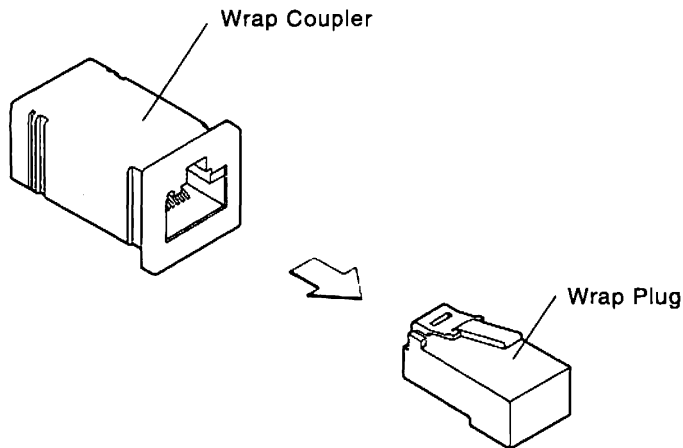
– Go to Step 019 on page 2-43.

005

Run a port wrap to test a failing ISDN Adapter port using Online Test 16.

- Disconnect the ISDN cable from the failing adapter port.
- Plug the ISDN wrap plug into the ISDN adapter port.

MAP 0620 (continued)



- Run Online Test 16, Option 6 selecting the HG and PN, where HG=36, 37, 38, or 39 and PN=00, 01, 02, or 03. See "Test 16 Configuration C (Only): ISDN Adapter Tests" on page 2-258.

Is 4703 displayed in about 10 seconds?

Yes No

006

- Replace the ISDN Adapter and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.

007

Was the 3174 operational before the problem occurred?

Yes No

008

- Use Online Test 2, Option 2, to verify that the customizing response numbers are proper for your ISDN attachment. See "Test 2 Configuration B/C: Configuration Menu" on page 2-172.

009

(From step 002)

- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 Displayed?

Yes No

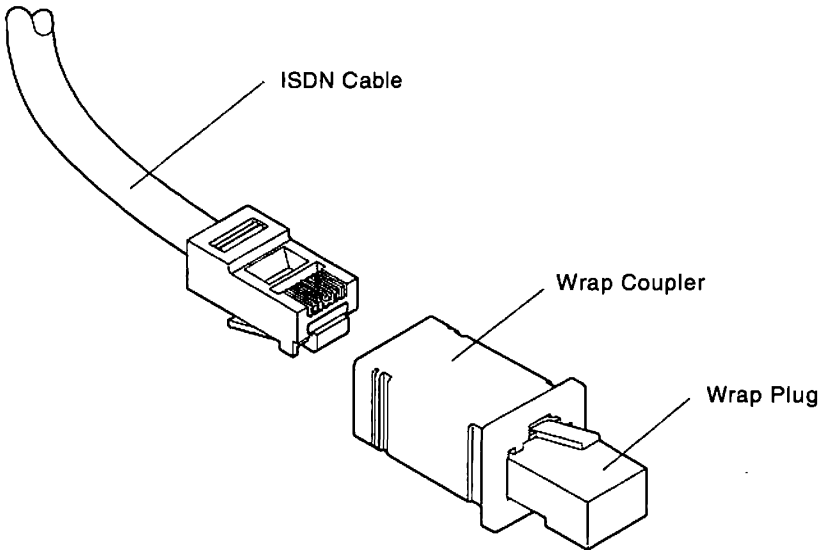
010

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

011

Run a port wrap to test the ISDN Adapter and the ISDN cable:

- Disconnect the ISDN cable that is attached to the failing port from the ISDN Network Terminator (NT1).
- Plug the ISDN cable into the ISDN wrap coupler and wrap plug.



- Press **Enter**; 4001 appears
- Key in **HG03** (HG=36, 37, 38, or 39) and press **Advance**
- Key in the failing port number (PN=00, 01, 02, or 03)
- Press **Enter**.

Is 20HG displayed in about 45 seconds?

Yes No

012
 The ISDN Adapter or the ISDN cable is defective. Go to Step 014.

013

The ISDN Adapter and the ISDN cable are not the problem. The problem is most likely in the ISDN switching network or terminal.

- Contact the ISDN Network Administrator.

014

(From step 012)

Run a port wrap to test the ISDN Adapter:

- Remove the ISDN wrap coupler and wrap plug from the ISDN cable.
- Disconnect the ISDN cable from the adapter's failing port.
- Remove the ISDN wrap plug from the wrap coupler.
- Plug the ISDN wrap plug into the failing ISDN Adapter port.
- Press **Enter**; 4001 appears.
- Key in **HG03** (HG=36, 37, 38, or 39) and press **Advance**.
- Key in the failing port number (PN=00, 01, 02, or 03).
- Press **Enter**.

(Step 014 continues)

MAP 0620 (continued)

014 (continued)

Is 20HG displayed in about 45 seconds?

Yes No

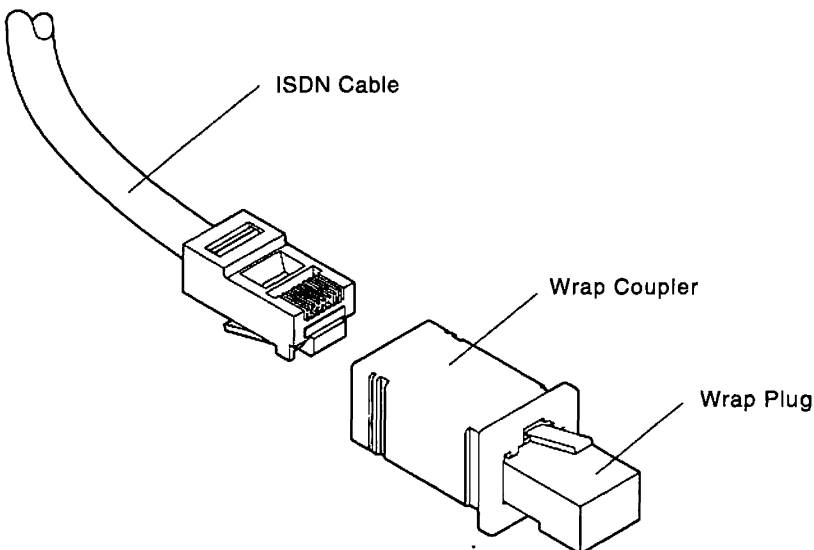
015

- Replace the ISDN Adapter and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.

016

The ISDN cable is the cause of the problem. The fuses located in the ISDN cable may be defective. Perform the following tasks to test the fuses in the ISDN cable:

- Remove the ISDN wrap plug from the ISDN Adapter.
- Plug the ISDN cable into the ISDN Adapter.
- Plug the ISDN cable into the ISDN wrap coupler and wrap plug.



- Locate the fuse box on the ISDN cable.
- Replace the fuses in the fuse box. To remove the fuse, press down on the fuse holder with your thumb or a screwdriver, and turn it *counterclockwise*. This releases the fuse holders and enables you to replace the individual fuses. The part number for fuses used in the United States, Japan, and Canada is 39F9181. The part number for fuses used in World Trade countries is 39F9153.
- Press **Enter**; 4001 appears.
- Key in **HG03** (HG=36, 37, 38, or 39) and press **Advance**.
- Key in the failing port number (PN=00, 01, 02, or 03).
- Press **Enter**.

Is 20HG displayed in about 45 seconds?

Yes No

017

- Replace the ISDN cable and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.

018

(Step 018 continues)

018 (continued)

One of the fuses was defective.

- Reconnect the ISDN cable to the NT1 and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.

019

(From step 004)

Run a port wrap to test the ISDN Adapter:

- Disconnect the ISDN cable from the Adapter's failing port.
- Plug the ISDN wrap plug into the failing ISDN Adapter port.
- Run Online Test 16, Option 6 selecting the HG and PN, where HG=36, 37, 38, or 39 and PN=00, 01, 02, or 03. See "Test 16 Configuration C (Only): ISDN Adapter Tests" on page 2-258.

Is 4703 displayed in about 10 seconds?

Yes No

020

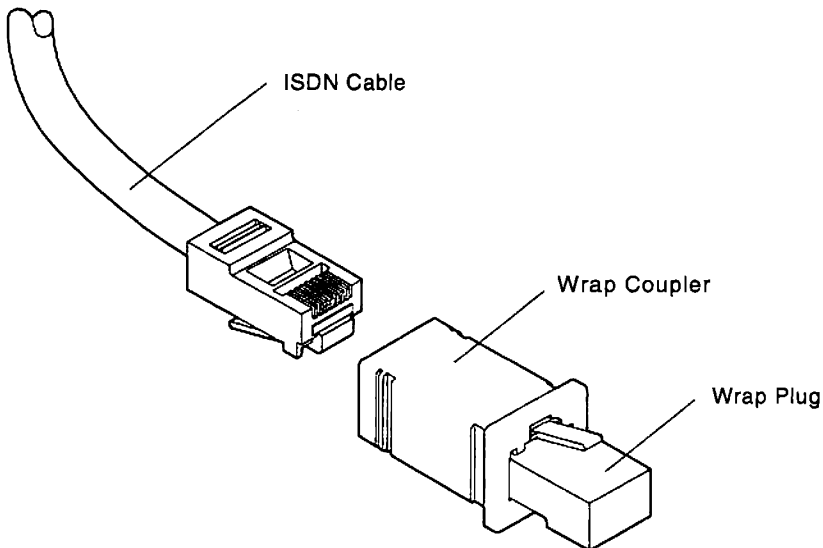
- Replace the ISDN Adapter and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.

021

The ISDN cable is the cause of the problem. The fuses located in the ISDN cable may be defective.

Perform the following tasks to test the fuses in the ISDN cable:

- Remove the ISDN wrap plug from the ISDN Adapter.
- Plug the ISDN cable into the ISDN Adapter.
- Plug the ISDN cable into the ISDN wrap coupler and wrap plug.



- Locate the fuse box on the ISDN cable.
- Replace the fuses in the fuse box. To remove the fuse, press down on the fuse holder with your thumb or a screwdriver, and turn it *counterclockwise*. This releases the fuse holders and enables you to replace the individual fuses. The part number for fuses used in the United States, Japan, and Canada is 39F9181. The part number for fuses used in World Trade countries is 39F9153.
- Run Online Test 16, Option 6 selecting the HG and PN, where HG=36, 37, 38, or 39) and PN=00, 01, 02, or 03. See "Test 16 Configuration C (Only): ISDN Adapter Tests" on page 2-258.

(Step 021 continues)

MAP 0620 (continued)

021 (continued)

Is 4703 displayed in about 10 seconds?

Yes No

022

- Replace the ISDN cable and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.

023

One of the fuses was defective.

- Reconnect the ISDN cable to the NT1 and return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.
-

MAP 0630: Ethernet Failures

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or symptom indicates an Ethernet Network communication problem.	<ul style="list-style-type: none"> Defective Ethernet adapter Defective Ethernet communication cable Improper customizing responses Ethernet Network

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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, refer to Safety Notice 10 in *3174 Safety Notices*.)

Warning: To prevent interruption of the host system, notify the host operator to take the controller offline. For information about taking your model offline, refer to "Taking the 3174 Offline" on page 2-290.

001

– Perform an Alt 2 IML. For information about performing an Alt 2 IML, see "Test All 82 (Alt 2 IML)" on page 2-97.

Is 2082 displayed?

Yes No

002

Refer to *3174 Status Codes* for an explanation of the status code.

003

Did the problem occur after the 3174 had been working?

Yes No

004

– Use Online Test 2, Option 2, to verify that the customizing response numbers are correct for your Ethernet attachment.

If you still have a problem, continue with Step 005.

005

– Disconnect the Ethernet cable from the Ethernet adapter.

– If 10BASE2 BNC cables are being used for the attachment, remove the 10BASE2 T-connector from the Ethernet adapter.

– Install all the wrap plugs on the appropriate connectors on the adapter.

– Display the 4001 prompt. To display the 4001 prompt, see "How to Load the Test Monitor" on page 2-102.

– Key in **4101** and press **Enter**.

(Step **005** continues)

MAP 0630 (continued)

| 005 (continued)

| **Is 2041 displayed?**

| **Yes No**

| **006**

| **Is 2941 or 3081 displayed?**

| **Yes No**

| **007**

| Refer to *3174 Status Codes* for an explanation of the status code.

| **008**

| – Replace the Ethernet adapter. For installation and removal instructions for the Ethernet adapter, refer to the card removal and replacement procedure in your base model maintenance information manual.

| **009**

- | – Remove all wrap plugs and reconnect the Ethernet cable to the appropriate connector on the Ethernet adapter.
 - | – Perform a normal IML. For information about performing a normal IML, see “Normal Initial Microcode Load (IML)” on page 1-41.
 - | – Use Online test 9 to display the LAN adapter test menu. From this menu you can check the status of the LAN, link, or adapter. For information about Online test 9, refer to “Test 9 Configuration B/C: Token-Ring and LAN Tests” on page 2-213.
 - | – Check for any status codes in the event log that pertain to the Ethernet adapter (HG41). Run Test 1 Event Log (Option 2). For information about Online Test 1, Option 2, refer to “Test 1 Configuration B/C: Display Logs Menu” on page 2-166.
 - | – If you find problems with the Ethernet Network, refer to your Ethernet documentation.
-

MAP 0710: Power Load Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The DC indicator is off because of a power overload condition, or the Power On Reset signal is being held on.	<ul style="list-style-type: none"> • Defective power supply • Defective logic card (locations 11 through 15) • Defective diskette drive (locations 1, 2) • Defective fixed disk drive (location 2) • Defective operator panel (location 6) • Defective fan (locations 42, 43) • Defective planar board. <p>Note: Use the card unseating procedure in this MAP to isolate the problem.</p>

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 the power cord before disconnecting cables or removing a component, such as the planar board, power supply, or diskette drive. (For translation of this safety notice, see Safety Notice 10 in *IBM 3174 Safety Notices*, GA27-3824.)

001

The power supply is designed to operate while unseated from the logic board.

- Switch power off.
- Unseat the power supply.
- Switch power on.

Is the DC indicator lit?

Yes No

002

Replace the power supply.

003

- Switch power off.
- Reseat the power supply.
- Switch power on.

Is the Data Transfer indicator off?

Yes No

004

System reset is being held active. Go to "MAP 0420: Status Code 8888 Displayed" on page 2-30.

005

(Step 005 continues)

MAP 0710 (continued)

005 (continued)

- Unseat all the logic cards in locations 11 through 15.
- Switch power on.

Is the DC indicator still off?

Yes No

006

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

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

007

- Unseat the FRUs as a group:
 - Unseat the diskette drives (locations 1 and 2).
 - Carefully unseat the fixed disk drive (if installed).
 - Unplug the rear fan.

- Switch power on.

Is the DC indicator still off?

Yes No

008

- Reseat the FRUs that were unseated in Step 007 of this MAP, one at a time, and switch on power after you reseat each FRU.

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

Note: After switching power off, wait at least two seconds before you switch power on.

009

- Reconnect the fan, diskette drives, and fixed disk drive.
- Remove the operator panel.
- Switch power on.

Is the DC indicator still off?

Yes No

010

Replace the removed operator panel.

011

- There is a possibility that the fan on the planar board is causing the problem. Replace it before replacing the planar board. See "Fan Removal/Replacement" on page 3-14.
 - Replace the planar board.
-

MAP 0800: FRU ID Bus Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Status code 1048. Any card or diskette drive can cause an FRU ID bus failure.	<ul style="list-style-type: none"> • Defective planar board • Defective logic board • Any logic card in locations 11 to 15 • Storage cards in locations 22 and 23 • Defective diskette drive or fixed disk drive.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

- Remove the decorative panel from the front of the 3174.
- Install the Utility diskette into drive 1 or use the fixed disk if Utility microcode is on the fixed disk.
- Visually check the indicator light on the planar board. You must remove the operator panel to view the indicator light. It is located to the left of the operator panel connector on the planar board.

Note: After you switch on power or perform an IML, it takes about 20 seconds for the indicator to start blinking on (long) and off (short).

Is the indicator blinking?

Yes No

002

Replace the planar board.

003

Reduce the machine to a basic configuration.

- Unseat all cards in locations 11 through 15, the diskette or fixed disk drive (if present) in location 2, and the additional storage card in location 23 (on the planar).
- Switch power on and wait about 20 seconds to check the indicator light.

(Step **003** continues)

MAP 0800 (continued)

003 (continued)

Is the indicator blinking?

Yes No

004

- Reseat the FRUs you unseated one at a time and test. When the indicator starts blinking again, exchange the failing FRU with a new one.
- If the replacement FRU does not **stop** the indicator from blinking, then one at a time, replace the following:
 - Planar board
 - Diskette drive in location 01
 - Storage card in location 22 on the planar board
 - Operator panel.

If the indicator is still blinking, use your support structure for aid.

- Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.

005

Use your support structure for aid.

MAP 0900: Channel Problems

Symptom Explanation

Action

For the Model 22L only

Go to "MAP 0930: Enterprise Systems Connection Adapter Problems" on page 2-58.

The 3174 fails to go online or offline

Go to "MAP 0910: Online/Offline Channel Problem (Model 21L)" on page 2-52.

A channel problem occurs when the 3174 power is switched on or off

Go to "MAP 0910: Online/Offline Channel Problem (Model 21L)" on page 2-52.

All other problems between the host/channel and the 3174

Go to "MAP 0920: Local Channel 3174 Isolation" on page 2-54.

MAP 0910: Online/Offline Channel Problem (Model 21L)

CAUTION:

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

001

Symptom Explanation	Action
3174 fails to go Online (Offline indicator stays on).	Go to Step 002.
3174 fails to go Offline (Offline indicator stays off).	Go to Step 004.
A channel problem occurs when the 3174 power is switched on or off.	Go to Step 003.

002

(From step 001)

- Verify that the priority switches are set to either high or low priority. See "Priority Switches" on page 4-2.
- To put the 3174 online, a normal IML is required.
- See "How to Place the 3174 Model 21L Online" on page 2-290.
- Replace the planar board.

003

(From step 001)

- Replace the planar board.
- Replace the power supply.

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

004

(From step 001)

3174 fails to go offline (Offline indicator stays off).

- Verify the offline procedure. See "How to Take the 3174 Model 21L Offline" on page 2-290.
- Verify that the priority switches are set to either high or low priority. See "Priority Switches" on page 4-2.
- Check that the Channel Interface switch is set to Offline.
- Press and hold **Alt 1**; then press and release **IML**.

(Step 004 continues)

004 (continued)

Is the Offline indicator on?

Yes No

005

- Force the 3174 offline with the power-down method. Set the power switch to Off.
- Replace the planar board.
- Replace the operator panel.

Note: After replacing the board, use the **Warning** procedure again to restore the 3174.

006

The channel interface or 3174 was probably in a disabled state.

- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 displayed?

Yes No

007

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

008

- Press **Enter** to display the 4001 prompt.
- Key in **1602** and press **Enter**.

Is status code 4530 displayed and is the Offline indicator on?

Yes No

009

- Replace the planar board.
- Replace the operator panel.

010

- Set the Channel Interface switch to Online. Status code 4531 should be displayed.

Is the status code 4531 displayed and the offline indicator off?

Yes No

011

- Replace the planar board.
- Replace the operator panel.

Note: After replacing the board, use the **Warning** procedure again to restore the 3174.

012

- Change the switch position a few more times, and again verify the results.
 - If the disabled state persists, go to "MAP 0920: Local Channel 3174 Isolation" on page 2-54.
 - Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See "Normal Initial Microcode Load (IML)" on page 1-41.
-

MAP 0920: Local Channel 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or a symptom is indicating a host-to-3174 communication problem.	<ul style="list-style-type: none"> Defective planar board High/Low Priority switch not set to High or Low Improper customizing option or attachment response number Host unit control word (UCW) assignment for the 3174 is improper Bus and Tag cable connectors or socket pins are bent or broken.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

001

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Check for any status codes in the event log pertaining to the Channel Adapter (HG16). At a 3278 or similar display, run Test 1, Option 2. See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166.

Find your symptom in the following chart then complete the action for that symptom.

Symptom Explanation	Action
Host system is indicating a message of channel overrun or lost data.	Check the High/Low Priority switch setting. See "Priority Switches" on page 4-2.
Host or 3174 problem after successful customizing or installation.	Go to Step 004 on page 2-55.
Problem after 3174 had been working.	Go to Step 006 on page 2-55.

004

(From step 003)

- Check that the High/Low Priority switch is set to the High or Low position. See “Priority Switches” on page 4-2.
- Use Online Test 2, Option 2, to verify that customizing response numbers 100, 101, 104, 105, 224, 225 are appropriate for your 3174 options and channel attachment. See “Test 2 Configuration B/C: Configuration Menu” on page 2-172.
- Verify that the proper unit control word (UCW) subchannel assignment for the 3174 has been made in the host. (Consult with the host service representative if necessary.) The 3174 operates with shared or unshared UCWs and supports disconnect command chaining (DCC). Block multiplexer channels on some host systems do not support DCC with shared UCWs. For non-SNA attachment, a shared UCW with disconnect command chaining is recommended. For SNA attachment, an unshared UCW is recommended. Several factors, such as other controllers on the channel, availability of UCWs, and priority, should be considered when assigning UCWs. Sometimes a deviation from these recommendations degrades system performance. For more information about UCWs, see Chapter 4.

Does the channel to the 3174 still fail?

Yes No

005

Return the 3174 to operational status with a normal IML from the Control diskette or from the fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.

006

(From steps 003 and 018)

- Check that the High/Low Priority switches are set to the High or Low position. See “Priority Switches” on page 4-2.

Do you have a spare planar board?

Yes No

007

Go to Step 017 on page 2-57.

008

Before removing the planar board, see the **Warning** at the start of this Map or host problems can occur.

Note: After replacing the board use the **Warning** procedure again to restore the 3174.

- Replace the planar board.
- Use the **Warning** procedure at the start of this map again to restore the 3174.
- Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-43.

(Step **008** continues)

MAP 0920 (continued)

008 (continued)

Is 2082 displayed?

Yes No

009

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

010

- Perform a normal IML (see “Normal Initial Microcode Load (IML)” on page 1-41) to load the operational code and then place the 3174 online to verify the repair. See “How to Place the 3174 Model 21L Online” on page 2-290.

Does the channel to the 3174 still fail?

Yes No

011

Return the 3174 to the customer.

012

- To run the driver/receiver wrap test, you need:

Wrap plug	P/N 4299873
Wrap plug	P/N 6246339
Terminator	P/N 2282676
Terminator	P/N 2282675

Do you have the wrap and terminator plugs?

Yes No

013

- Run OLTs if available in your host system configuration. See the OLTs in Chapter 2 under “3174 Display Subsystem OLTs.”

If the problem still exists, use your support structure for aid.

014

(From step 019)

- Perform the driver/receiver wrap test. See “How to Run the Channel Driver/Receiver Wrap Test (FN 01)” on page 2-123.

Is 2016 displayed?

Yes No

015

- Verify that the Priority switches are set to either High or Low priority. The wrap test result shows a failing code of 3011 and the associated Bus In and Tag In signal lines that are failing. Inspect the Bus In and Tag In socket pins for a possible defect. See the “Wrap Test Analysis” on page 2-124.
- Replace the tailgate assembly.

016

- The path to the Tag Out and Bus Out sockets are not tested with the wrap test. Visually inspect the Tag Out and Bus Out sockets for bent or broken pins.

(Step 016 continues)

016 (continued)

- Run OLTs if available in your host system configuration. See “3174 Display Subsystem S/370 OLTs” on page 2-317.
 - If the problem still exists, use your support structure for aid.
-

017

(From step 007)

To run the driver/receiver wrap test, you need:

Wrap plug	P/N 4299873
Wrap plug	P/N 6246339
Terminator	P/N 2282676
Terminator	P/N 2282675

Do you have the wrap and terminator plugs?

Yes **No**

018

- Run OLTs if available in your host system configuration. See the OLTs tests in Chapter 2 under “3174 Display Subsystem OLTs.”
- Obtain the cards for location 10, 11, or the wrap plugs to isolate the problem. Go to Step 006 on page 2-55.

019

Go to Step 014 on page 2-56.

MAP 0930: Enterprise Systems Connection Adapter Problems

Symptom Explanation	Conditions That Could Cause This Symptom
Any problem with the fiber optic link.	<ul style="list-style-type: none"> • The Enterprise Systems Connection Adapter • The fiber optic cable • The host fiber optic link.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 22L Offline" on page 2-291.

001

Perform an ALT 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Perform the Enterprise Systems Connection Adapter Interface Wrap Test.

- Remove the fiber optic cable from the Enterprise Systems Connection Adapter (ESCON Adapter).
- Clean the Enterprise Systems Connection Adapter Wrap Plug using the fiber optic cleaning kit.
- Insert the wrap plug into the connector on the ESCON Adapter.
- If 4001 is not displayed, press **Enter**. If 4001 is still not displayed, load the test monitor. See "How to Load the Test Monitor" on page 2-102.
- At 4001, key in **1701**
- Press **Enter**, the test begins.

Does the test run successfully and display status code 2017?

Yes No

004

Replace the ESCON Adapter and verify the repair.

005

Measure the transmit and receive levels at the ESCON Adapter. See "Measuring the 3174 Enterprise Systems Connection Adapter Transmit and Receive Levels" on page 2-295.

(Step 005 continues)

005 (continued)

Is the transmit power level at -21.0 dBm or more (for example, -18.0 dBm)?

Yes No

006

Replace the ESCON Adapter and verify the repair.

007

Reconnect the fiber optic cable to the ESCON Adapter and go to *Maintenance Information for Enterprise Systems Connection Links, SY27-2597*, or *ESCON Link Fault Isolation, SY22-9533*.

MAP 1000: ASCII Problem Entry

001

You need the following failure information to be directed to the proper MAP. This information can be obtained from a status code, from the Event Log (Test 1, Option 2), or from customer reports.

– For the failing port, verify that your status information identifies one item of each of the following steps.

Note: If you have multiple failures, the Port Status Worksheet, Figure 2-2 on page 2-62, can make it easier for you to compile the status information. Make a photocopy of the worksheet and then use that copy to record the errors.

1. Is the failing port connected to one of the following?

- Printer
- Display station
- ASCII Host
- Modem.

2. Is the failing port attached as one of the following?

- Switched line connection
- Leased line (nonswitched) connection
- Direct line connection.

3. Is the failing port Hardware Group equal to HG=21, 22, 23, 26?

Is any of the preceding information (items 1, 2, and 3) *not* known?

Yes No

002

Go to Step 007 on page 2-63.

003

– Run the following Online tests to obtain failure information and use the worksheet on page 2-62 that shows a summary of the information required for each port. This worksheet also shows the connection path between a terminal and host. Record the information on a photocopy and leave the original blank.

– The Online test can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

– If you have to use an ASCII terminal to run Online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find out which key sequence you have to use.

– Log off the current customer application.

– Use one of the following procedures, depending on the type of terminal, to enter test mode:

- **3270 Procedure**—At the 3278 (or equivalent) terminal, hold the ALT key down while pressing TEST. Press PF12, then select Test 12 (Asynchronous Emulation Adapter Tests). Go to item 5 below.

- **ASCII Procedure**—Your ASCII terminal must have a Connection Menu displayed before you can enter test mode. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

1. At your terminal, switch power off and then on. Press the CR key. If the port is configured for autobaud, press CR . CR. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you can bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus shown below (item 2 or 3).

2. **Terminal Type Menu**—Type in your terminal emulation selection for your terminal type and press the **CR** or **ENTER** key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).

(Step 003 continues)

003 (continued)

3. Keyboard MAP menu—Key in the requested information and press the **CR** or **ENTER** key. The 3174 should then respond with the Connection Menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the **ESC** key and then typing **T**.) Type in **12** and press the **CR** or **ENTER** key. After the 3174 test menu appears, type in **12** and press the **CR** or **ENTER** key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

Note: If you are not able to enter test mode, go back to step 1 of this procedure.

5. After the 3174 test menu appears on the screen, select the tests by following the menu selections:
 - Select the Asynchronous Emulation Adapter Tests menu, Option 2 (Display Status Summary). Verify the screen results. See “Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests” on page 2-237.
 - Select the 3174 Test Menu and run Test 3 (Status Summary) for the Host line. Verify that the ports having an A on the Host line are ASCII terminals. See “Test 3 Configuration B/C: 3270 Device Status Information” on page 2-175.
 - Select the 3174 Test Menu and run Test 1, Option 2 (All Events Log) and verify the screen results. Note the Primary and Connection port numbers for a failing port path. See “Test 1 Configuration B/C: Display Logs Menu” on page 2-166.
- To identify your terminal/device configuration, use the cabling worksheets (supplied by the customer) or the customer’s equivalent cabling configuration.

MAP 1000 (continued)

Port Status Worksheet																								
Asynchronous Emulation Adapter Ports																								
AEA Ports	HG 21							HG 22							HG 23									
	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Fail/Ports (F)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Terminal (T)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Printer (P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Host (H)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Switched (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Leased (L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fail/Direct (D)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3270 Terminal 3A connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ASCII Terminal AA connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ASCII Terminal A3 connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3270 Terminal/Multiplexed Ports																								
HG26																								
3270 Ports	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15								
3270 Terminal 3A connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
HG26																								
3270 Ports	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
3270 Terminal 3A connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
HG27																								
3270 Ports	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15								
3270 Terminal 3A connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
HG27																								
3270 Ports	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
3270 Terminal 3A connection to ASCII host	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								

Figure 2-2. Port Status Worksheet

Were you unable to identify any failing ports?

Yes No

004

Go to Step 007 on page 2-63.

005

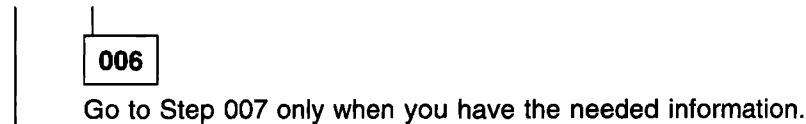
(Step 005 continues)

005 (continued)

- You need to get more information defining the problem from the customer. There can be situations when a failure does not indicate a status code. For example, if a terminal user is not able to communicate with an ASCII host, the problem can be the path to the 3174, and thus the 3174 microcode is not aware of the failing inbound path.
- You need information from the customer that defines the connectivity inbound and outbound port paths that are failing. Before seeing the customer, **continue** in this MAP.
- The 3270-type terminal or ASCII terminal that is communicating with a 3270 or ASCII host has three possible connection-path categories:
 - ASCII terminal to ASCII Host—This path (pass through) uses an AEA port to communicate to an ASCII terminal and a second AEA port to communicate to the ASCII host.
 - 3270-type terminal to ASCII Host—This 3270 terminal, running ASCII emulation, uses a port on the Terminal Adapter/Multiplexer and a port on the AEA card to communicate with the ASCII host.
 - ASCII terminal to 3270 host—This ASCII terminal, running 3270 emulation, uses a port on the AEA card only.

Do you have the connectivity path and the other port information?

Yes No



007

(From steps 002, 004, and 006)

Use the following chart and select the first symptom that applies to the failure, then take the appropriate action.

Note: After a MAP isolates a failure, return here to select the next symptom. Return here if only part of a connectivity path has been tested. Select the symptom that relates to the other part of the connectivity path not tested yet, and follow that action.

Symptom Explanation	Action
All ASCII ports are failing.	Go to "MAP 1010: All ASCII Ports Are Failing" on page 2-64.
ASCII Direct attached ports—any failing combination.	Go to "MAP 1020: Direct Attached Ports—Any Failure" on page 2-66.
ASCII Leased line (nonswitched) ports—any failing combination.	Go to "MAP 1030: Leased Line (nonswitched) Port—Any Failure" on page 2-73.
ASCII Switched line ports—any failing combination.	Go to "MAP 1040: Switched Line Port—Any Failure" on page 2-80.
3278 type terminal customized to communicate to ASCII Host—Any failing combination.	Go to "MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host" on page 2-94.

MAP 1010: All ASCII Ports Are Failing

Symptom Explanation	Conditions That Could Cause This Symptom
All devices attached to ASCII ports are failing.	<ul style="list-style-type: none"> • Defective Asynchronous Emulation Adapter card • Loose cable connectors • Incorrect 3174 customizing • Incorrect terminal setup • Open or shorted wires in communication cables • Defective I/O panel or cable.

CAUTION:

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

001

– Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-43.

Is 2082 displayed?

Yes No

002

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

003

Did the problem occur after the 3174 had been working?

Yes No

004

Verify the 3174 customizing questions and the failing device’s setup options. ASCII terminal setup options are described in *3174 Terminal User’s Reference for Expanded Functions*.

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

005

Online tests can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

– If you have to use an ASCII terminal to run Online tests, see the *3174 Terminal User’s Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence.

– Perform a normal IML from a Control diskette or fixed disk. See “Normal Initial Microcode Load (IML)” on page 1-41.

– Use the AEA wrap plug (39F6853) that is shipped with the 3174, remove the cable and **install the wrap plug** on the proper AEA (21, 22, or 23) port (0-7).

Note: Use your Hardware Group (HG) number to determine the failing card location. (The AEA card with the lowest card location number is HG21, the next highest number is HG22, and the highest number is HG23.)

– To enter test mode at the 3278 (or equivalent) terminal, press and hold the ALT key and press the TEST key. Press PF12. Select Test 12, and then Option 1 (AEA Port Test Menu).

– After the AEA Port Test Menu appears on the screen, key in **2, PN, HG** where PN = Port Number and HG = Hardware Group. Press the ENTER key. A ready message (READY) or a status code (xxxx) is displayed at the implementing terminal screen.

Did the READY message appear on top of the screen?

Yes No

006

- Replace the AEA card that corresponds to the failing hardware group.

007

- Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?

Yes No

008

- Replace the AEA card that corresponds to the failing port and hardware group.

009

- Remove the wrap plug and reinstall the original cable.
 - If this is a new installation, verify that the communication cables are connected to the correct 3174 AEA ports and host/terminal modem destinations.
 - If this is a new installation, verify that the proper communication cable is being used. (Direct cable wiring crosses over to different pins at the host/terminal end). See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130. Switched and Nonswitched cable wiring is the same at each cable end (no crossover of wires). See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
 - If this is a new installation, return to the 3174 Test Menu, select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). Verify that the port is direct and that the Station line (v p h) agrees with the customizing.

Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.
 - Check for communication cable defects.

Switched and Nonswitched cables—You can run the wrap test through the cable if you are able to get a cable matcher connector for the wrap plug. This connector allows you to connect the wrap plug with the cable connector. This item can be ordered from vendor catalogs. See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.

Direct cables—To do a wrap test through the cable requires the insertion of the EIA Interface Monitor (breakout box; P/N 453637) at the end of the cable. The breakout box must then be jumpered to match the wrap plug wiring. The cable connector can also require the insertion of the conversion connector at the breakout box. See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
 - Use your support structure for aid.
-

MAP 1020: Direct Attached Ports—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A terminal, printer, or ASCII Host through its direct cable path to a 3174 port is failing.	<ul style="list-style-type: none"> • Defective Asynchronous Emulation Adapter card • Open or shorted wires in the communication cable • Loose cable connectors • Failing terminal, printer, or host • Incorrect 3174 customizing • Incorrect terminal, printer, or host setup options • Incorrect null modem wiring • Cable problems due to excessive noise • Defective I/O panel or cable.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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

If the problem is with one attached terminal, verify that the customer has performed the terminal manufacturer's checkout test procedures. Also do the same for other terminals if this is a new installation or 3174 customizing parameters have been changed.

If the problem is with the direct connection path to an ASCII host, verify that the host system operator was called for the host status condition.

Online tests can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332 to find the correct keying sequence you have to use.

- Log off the current customer application.
- Use the AEA Wrap Plug (39F6853) that is shipped with the 3174 and **install the wrap plug** on the proper AEA (21, 22, or 23) connector (0-7).

Note: Use the Hardware Group (HG) number to determine the failing card location. (The AEA card with the lowest card location number is HG21, the next highest number is HG22, and the highest number is HG23.)

- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:
 - 3270 Procedure—At the 3270-type terminal, hold down the ALT key while pressing TEST. Press PF12. Select Test 12 (Asynchronous Emulation Adapter Tests), and then Option 1 (AEA Port Test Menu). Go to item 6 below.
 - ASCII Procedure—Before you can enter test mode, your ASCII terminal must display a Connection Menu. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:
 1. At your terminal, switch power off and then on. Press the CR key. If the port is configured for autobaud, press CR . CR. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you can bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).

2. Terminal Type Menu—Type in your terminal emulation selection for the terminal from which you are running, and press the **CR** or **ENTER** key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).
3. Keyboard MAP menu—Key in the requested information and press the **CR** or **ENTER** key. The 3174 should then respond with the Connection Menu.
4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the **ESC** key and then typing **T**.) Type in **12** and press the **CR** or **ENTER** key. After the 3174 Test menu appears, select Test 12 and press the **CR** or **ENTER** key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).
Note: If you are not able to enter test mode, go back to item 1 of this procedure.
5. To view messages in the operator information area, press **ESC** and then press the Shift key and press the ? key.
6. From the AEA Port Tests menu, select Option 2 (AEA Port Wrap) with the port and hardware group information. Press the **CR** or **ENTER** key.

Did the READY message appear on top of the screen?

Yes No

002

- Replace the AEA card that corresponds to the failing port and hardware group.

003

- Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?

Yes No

004

- Replace the AEA card that corresponds to the failing hardware group. If another AEA card is installed, you can use that card as a replacement.

005

(From step 011)

- Return to the AEA Port Tests menu and do the following for the terminal you are using.
 - 3270 type terminal—Perform the ALT and TEST key function two times.
 - ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing **ESC**, then hold **CTL** while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.
- Remove the wrap plug and reinstall the communication cable.

Is the failing port connected to an ASCII terminal or printer?

Yes No

006

(Port is attached to an ASCII host.)

Go to Step 014 on page 2-69.

MAP 1020 (continued)

007

This test allows data to be sent from a terminal to another terminal/printer. The terminal/printer receiving the data must be checked for the correct characters.

The characters are not displayed at the terminal being used to send the data. The tested terminal should be able to enter characters. The same characters should then be displayed at your terminal.

- Run the following default transmit test (Option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.
- Add the port and hardware group information to Option 3 (this causes the default settings to be used) and press CR or the ENTER key.
- Type in a string of characters and verify the characters are displayed by the other terminal/printer.

Did the other terminal/printer show the proper characters?

Yes No

008

Go to Step 021 on page 2-70.

009

- On the terminal at the remote end, type in a string of characters. These same characters should then be displayed on the original terminal you started with when you began the test.

Did the original terminal show the proper characters?

Yes No

010

Go to Step 021 on page 2-70.

011

- If the original customer problem is not repeatable, then you should do the following to check for a noisy communication line. The device can also cause this problem.

1. Reenter test mode, select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary).
2. Check the AEA port for excessive line errors. These errors are counted by the line counter. If the line counter log has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-31. (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See Step 005 on page 2-67.)
3. Check for any status codes in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166.
4. Determine if this is the problem.

- If the problem is repeatable, and if extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:

Verify that the customer did not change 3174 customizing parameters, device setup options, host application, or host data stream.

(Step 011 continues)

011 (continued)

Was the problem isolated?

Yes No

012

To continue problem isolation, you need the hardware group and port number of the host with which terminal is communicating. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
– Use your support structure for aid.

013

Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.

014

(From step 006)

Did the host problem occur after this port had been working?

Yes No

015

Verify the 3174 customizing questions and the failing device's setup options. See the *3174 Terminal User's Reference for Expanded Functions, GA23-0332*. Verify your terminal setup options.

If you still have a problem, go to Step 016.

016

(From step 015)

– Use the customer's log or procedure and try to communicate with the host.

Were you able to communicate with the Host?

Yes No

017

(From steps 022, 024, and 026)

1. Verify that the 3174 communication cable is securely connected at each cable end.
2. If this is a new installation, verify that the communication cable is connected to the proper 3174 AEA port and goes to the proper host destination.
3. If this is a new installation, verify that the proper communication cable is being used. (The cable wiring crosses over to different pins at the host communication end.) See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
4. If this is a new installation, return to the 3174 Test Menu. Select Test 12 (Asynchronous Emulation Adapter Tests menu), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.) Check that the port is direct, and the Station line (v p h) agrees with customizing.

Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.

5. Check for communication cable defects. To do a wrap test through the cable requires the insertion of the EIA Interface Monitor (breakout box; P/N 453637) at the end of the cable. This allows the cable plug to be jumpered to match the wrap plug wiring. The wrap plug can also require the insertion of a cable matcher connector that would then allow connecting the wrap plug to the cable. You can obtain the cable matcher connector from vendor catalogs.

MAP 1020 (continued)

018

1. Select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu.
2. Check the AEA port for excessive cable errors. These errors are counted by the cable counter. If the cable counter log is has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any status codes in the event log pertaining to the AEA port (From the 3174 Test Menu, select Test 1, Option 2.) See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166 and "3174 Event Log" on page 1-31.
4. Verify that the customer did not change customizing parameters, host application, or the host data stream.

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment specifications for EIA 232D require a cable between 1 meter and 15 meters (3 to 50 feet); the line speed range is from 300 to 19.2 Kbps.

Was the problem isolated?

Yes No

019

- Use your support structure for aid.

020

- Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
-

021

(From steps 008 and 010)

Did the problem occur during customizing or installation?

Yes No

022

- Go to Step 017 on page 2-69.

023

- You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits. These four parameters must be correct and must match between the 3174 and the device. The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.
- Return to the 3174 Test Menu and select Test 2, Option 4 (Asynchronous Emulation Adapter Configuration).
- Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customizing Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device may have the ability to display a setup menu that shows its setup options. These options must be correct and match the 3174.

- Display the setup menu, see the manufacturer’s documentation or check with the customer.

Note: The 3174 does not support BLOCK operating mode and supports 7 or 8 data bits as the data word length, depending on the configuration level. See the *3174 Terminal User’s Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

- Compare your terminal setup options with the 3174 customizing parameters and update your terminal setup menu, or you can match the parameters when the transmit test is performed in the following step.

Did you find a mismatch between terminal setup and 3174 customizing?

Yes No

024

Verify the other 3174 customizing questions and the failing device’s other setup options. See *3174 Terminal User’s Reference for Expanded Functions* and verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-69.

025

1. Return to the AEA Port Tests menu.
2. In the following chart, find the W, X, YY, ZZ number that you should enter for these parameters.
3. Add the port, hardware group, and override option parameters, and press the **CR** or **ENTER** key. You should then get a READY message.
4. Type in a string of characters and verify that they appear on the receiving device. **Characters are not displayed at your terminal.**

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Odd	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Even	20 = DTR	
3 = 1200 bps	3 = None	80 = XON/XOFF (any)	
4 = 2400 bps	4 = Space	C0 = XON/XOFF (XON)	
5 = 4800 bps	5 = Mark		
6 = 9600 bps			
7 = 19 200 bps			

MAP 1020 (continued)

Did the terminal, printer, or host show the proper characters?

Yes No

026

Go to Step 017 on page 2-69.

027

Note: At the tested terminal on the remote end, characters entered on the keyboard should then be displayed at your terminal.

– If needed, return to “MAP 1000: ASCII Problem Entry” on page 2-60.

MAP 1030: Leased Line (nonswitched) Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A terminal, printer, or ASCII Host, connected through a leased or nonswitched line to a 3174 port is failing.	<ul style="list-style-type: none"> • Defective Asynchronous Emulation Adapter card • Open or shorted wires in the communication cable • Loose cable connectors • Defective modem • Defective terminal • Incorrect 3174 customizing • Incorrect terminal or printer setup options • Cable problems due to excessive noise • Communication line noise • ASCII Host • Defective I/O panel or cable.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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

- If the problem is with one attached terminal, verify that the customer has performed the terminal manufacturer's checkout test procedures. Also do the same for other terminals if this is a new installation, or if 3174 customizing parameters have been changed.
- If the problem is with the nonswitched connection path to an ASCII host, verify that the host system operator was called for the host status condition.

Online tests can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

- If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence you have to use.
- Find a known working terminal.
- Log off the current customer application.

Use the AEA Wrap Plug (39F6853) that is shipped with the 3174 and **install the wrap plug** on the proper AEA (21, 22, or 23) port (0-7).

Note: Use your Hardware Group (HG) number to determine the failing card location. (The AEA card with the lowest card location number is HG21, the next highest number is HG22, and the highest number is HG23.)

- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:
 - 3270 Procedure—At the 3278 (or equivalent) terminal, hold down the ALT key while pressing TEST. Press PF12. Select Test 12 (Asynchronous Emulation Adapter Tests), and then Option 1 (AEA Port Test Menu). Go to item 6 in the following list.

MAP 1030 (continued)

- ASCII Procedure—Before you can enter test mode, your ASCII terminal must display a Connection Menu. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:
 1. At your terminal, switch power off and then on. Press the CR key. If the port is configured for autobaud, press CR . CR. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you can bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).
 2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are running from and press the **CR** or **ENTER** key. The 3174 should then respond with the Use Specific Keyboard MAP or the Connection Menu.
 3. Keyboard MAP menu—Type in the requested information and press the **CR** or **ENTER** key. The 3174 should then respond with the Connection Menu.
 4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the **ESC** key and then typing **T**.) Type in 12 and press the **CR** or **ENTER** key. After the 3174 Test menu appears, select Test 12 and press the **CR** or **ENTER** key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).

Note: If you are not able to enter test mode, go back to step 1 of this procedure.
 5. To view messages in the operator information area, press **ESC** and then press the Shift key and press the ? key.
 6. From the AEA Port Tests menu, select Option 2 (AEA Port Wrap) with the hardware group and port information. Press the **CR** or **ENTER** key.

A ready message (READY) or a status code (xxxx) is displayed at the implementing terminal screen.

Did the READY message appear on top of the screen?

Yes No

002

– Replace the AEA card that corresponds to the failing hardware group.

003

– Type in a string of characters. If the test is successful, each character should be displayed on the screen.

(Step 003 continues)

003 (continued)

Were all the characters displayed as expected?

Yes No

004

- Replace the AEA card that corresponds to the failing hardware group.

005

- Return to the AEA Port Tests menu using the following:
 - 3270 terminal type—Perform the ALT and TEST key function two times.
 - ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing **ESC**, then hold **CTL** while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions, GA23-0332*.
- Remove the wrap plug and reinstall the cable.

Is the failing port connected to an AEA terminal or printer?

Yes No

006

(Port is attached to an ASCII host.)

Go to Step 014 on page 2-76.

007

This test allows data to be sent from a terminal to another terminal/printer and must be visually inspected at the tested device for the correct characters.

The characters are not shown at the terminal being used to send the data.

- Run the following default transmit test (option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.
- Add the port and hardware group information to option 3 (this causes the default settings to be used) and press the **CR** or **ENTER** key.
- Type in a string of characters and verify the characters are received by the other terminal/printer.

Did the other terminal/printer show the proper characters?

Yes No

008

Go to Step 021 on page 2-78.

009

- On the terminal at the remote end, type in a string of characters. These same characters should then be displayed at your terminal.

Did your terminal show the proper characters?

Yes No

010

Go to Step 021 on page 2-78.

MAP 1030 (continued)

011

- If the original customer problem is not repeatable, you should do the following to check for a noisy communication line. The device can also cause this problem.
 1. Select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu.)
 2. Check the AEA port for excessive line errors. These errors are counted by the line counter. If the line counter log has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-31.
 3. Check for any status codes in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166.
- If the problem is repeatable, and extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:
 - Verify that the customer did not change 3174 customizing parameters, device setup options, host application, or the host data stream.

Was the problem isolated?

Yes No

012

- To continue problem isolation, you need the AEA port number and the hardware group used for the host the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
- Use your support structure for aid.

013

Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.

014

(From step 006)

Did the host problem occur after this port had been working?

Yes No

015

- Verify the 3174 customizing questions and the failing device's setup options for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

If you still have a problem, go to Step 016.

016

(From step 015)

- Use the customer's log or procedure and try to communicate with the host.
- (Step 016 continues)

016 (continued)

Were you able to communicate with the host?

Yes No

017

(From steps 022, 024, and 026)

- Verify that the 3174 communication cable is securely connected at each cable end.
- If this is a new installation, verify that the communication cable is connected to the proper 3174 port and goes to the proper destination.
- If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals are the same at each cable end.) See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
- If this is a new installation, return to the 3174 Test Menu. Select Test 12 (Asynchronous Emulation Adapter Tests menu), then Option 2 (Display Status Summary). (From an ASCII terminal, use the Menu Request sequence as previously done in Step 005.) Check that the port is nonswitched, and that the Station line (v p h) agrees with customizing.

Note: If you are in test mode to a video/printer port, an h is displayed instead of the v or p.

- Check for communication cable defects. See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.

Note: The wrap test can be run through the cable if you are able to get a gender converter for the wrap plug. This connector allows the connection of the wrap plug with the cable connector. This item can be ordered from vendor catalogs.

- If this is a new installation and a limited-distance modem is attached to the 3174, check the unit for any switches that need to be set (for example, DCE or DTE). The telephone wiring that connects the modems can also be the cause of the problem.
- If the attachment is through a modem, then tell the customer to perform the modem problem determination and to check the phone wiring between the modems. Check the modem switches for proper settings. See "Modem Specifications and Switch Settings" on page 2-297.
- Use your support structure for aid.

018

1. Select Test 12 Asynchronous Emulation Adapter Tests, then select Option 2 (Display Status Summary). For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu.
 2. Check the AEA port line for excessive cable errors. These errors are counted by the cable counter. If the cable counter log has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
 3. Check for any status codes in the event log pertaining to the AEA port. From the 3174 Test Menu, Select Test 1, then Option 2 (All Events Logged). See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166 and "3174 Event Log" on page 1-31.
 4. Determine if this is the problem.
- Verify that the customer did not change customizing parameters, host application, or the host data stream.

(Step 018 continues)

MAP 1030 (continued)

018 (continued)

The customer can supply the cables that run from the 3174 to the communication equipment or order them from IBM. If the customer supplies his own cables, he should select shielded cables. The attachment specifications for EIA 232D require a cable between 1 and 15 meters (3 and 50 feet) and the line speed range from 300 to 19.2Kbps.

Was the problem isolated?

Yes No

019

- Use your support structure for aid.

020

- Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
-

021

(From steps 008 and 010)

Did the problem occur during customizing or installation?

Yes No

022

- Go to Step 017 on page 2-77.

023

- You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits. These four parameters must be correct and must match between the 3174 and the device. The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.
- Return to the 3174 Test Menu, select Test 2, then Option 4 (AEA Configuration).
- Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customizing Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type can have the ability to display a setup menu with the setup options that were set. These options must be correct and must match the 3174.

- Display the setup menu. See the manufacturer's documentation or check with the customer.

Note: The 3174 does not support BLOCK operating mode and only supports 7 or 8 data bits as the data word length, depending on the configuration level.

See Appendix B in *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

- Compare your setup menu options with the 3174 customizing parameters and update your terminal setup menu, or you can match the parameters when the transmit test is performed in the following step.

Did you find a mismatch between terminal setup and customizing?

Yes No

024

- Verify the other 3174 customizing questions and the failing device's other setup options for this feature. See Appendix B, in *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-77.

025

1. Return to the AEA Port Tests menu.
2. In the following chart, find the W, X, YY, ZZ number that you should enter for these parameters.

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Odd	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Even	20 = DTR	
3 = 1200 bps	3 = None	80 = XON/XOFF (any)	
4 = 2400 bps	4 = Space	C0 = XON/XOFF (XON)	
5 = 4800 bps	5 = Mark		
6 = 9600 bps			
7 = 19 200 bps			

3. Add the port, hardware group, and override option parameters, and press the **CR** or **ENTER** key. You should then get a READY message.
4. Type in a string of characters and verify the characters received by the terminal/printer.

Did the terminal/printer show the proper characters?

Yes No

026

Go to Step 017 on page 2-77.

027

On the terminal at the end, type in a string of characters. These same characters should then be displayed at your terminal.

- If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-60.

MAP 1040: Switched Line Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Printer or ASCII Host, connected through a switched line to a 3174 AEA port, is failing.	<ul style="list-style-type: none"> • Defective AEA • Open or shorted wires in the communication cable • Loose the cable connectors • Defective modems • Defective data phones • Defective terminal • Incorrect 3174 customizing • Incorrect terminal/printer or host setup options • Communication line noise • ASCII Host • Telephone line network • Defective I/O panel or cable.

CAUTION:

To avoid the possibility of electrical shock, switch off power and disconnect the 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

- Find out from the customer how many users are dialing into this failing AEA port. Also find out how many ports are failing. Find out from the host system operator if other equipment and its users are also having problems connecting to the host.

If the host users are only having problems with the 3174, continue with this MAP.

Online tests can be run from a 3278 (or equivalent) terminal or any ASCII terminal.

- If you have to use an ASCII terminal to run online tests, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, to find the correct keying sequence you have to use.
- Find a working terminal.
- Log off the current customer application.
- Use the AEA Wrap Plug (39F6853) that is shipped with the 3174 and **install the wrap plug** on the proper AEA (21, 22, or 23) connector (0-7).

Note: Use your Hardware Group (HG) number to determine the failing card location. (The AEA card with the lowest card location number is HG21, the next highest number is HG22, and the highest number is HG23.)

- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:
 - 3270 Procedure—At the 3270-type terminal, hold down the ALT key while pressing TEST. Press PF12. Select Test 12, and then Option 1 (AEA Port Tests Menu). Go to item 6 below.
 - ASCII Procedure—Before you can enter test mode, your ASCII terminal must display a Connection Menu. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:

1. At your terminal, switch power off and then on. Press the CR key. If the port is configured for autobaud, press CR . CR. The 3174 should then bring up a connection sequence. Depending on the 3174 customizing, you may see the Connection Menu or go through a sequence of either one or two menus as shown below.
 2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are using and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection Menu (item 4).
 3. Keyboard MAP menu—Type in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection menu.
 4. Connection Menu—Enter test mode for your terminal. (Most ASCII terminals usually require pressing the ESC key and then typing T.) Type in 12 and press the CR or ENTER key. After the 3174 Test menu appears, select Test 12 and press the CR or ENTER key. After the Asynchronous Emulation Adapter Tests menu appears, select Option 1 (AEA Port Tests).
- Note:** If you are not able to enter test mode, go back to item 1 of this procedure.
5. To view messages in the operator information area, press ESC and then press the Shift key and press the ? key.
 6. From the AEA Port Tests Menu, select Option 2 (AEA Port Wrap) with the port and hardware group information. Press the CR or ENTER key.

A ready message (READY) or a status code (xxxx) is displayed at the implementing terminal screen.

Did the READY message appear on top of the screen?

Yes No

002

– Replace the AEA card that corresponds to the failing hardware group.

003

– Type in a string of characters. If the test is successful, each character should be displayed on the screen.

Were all the characters displayed as expected?

Yes No

004

– Replace the AEA card that corresponds to the failing hardware group.

005

– Return to the AEA Port Tests menu by way of the following for your terminal type.

- 3278 (or equivalent)—Perform the ALT and TEST key function two times.
- ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing ESC, then hold CTL while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions, GA23-0332*.

– Remove the wrap plug and reinstall the communication cable.

(Step 005 continues)

MAP 1040 (continued)

005 (continued)

Is the failing port connected to an ASCII terminal or printer?

Yes No

006

(Port is attached to an ASCII host)

Go to Step 030 on page 2-88.

007

The problem can be either the local modem, remote modem, modem cables, phone line, phones, terminal, or the terminal's cable.

The following procedures are written for the IBM 5841/5842, and Hayes** or other modems that support the AT command set. When the attachment is Micom** or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation.

The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.

Are the modems the IBM 5841/5842, Hayes, or similar programmable modems?

Yes No

008

– If you have a Micom or compatible modem, see the manufacturer's documentation for those MAP steps that require references.

Go to Step 009.

009

(From step 008)

1. The port test menu should be displayed.
2. Select the Transmit test option (default settings). This selection allows the 3174 to send and receive data from the programmable modem. The AT command and data that follows, in this MAP sequence, then initiates a switched-line connection.
3. Add the port and hardware group information to Option 3 (default settings) and press the **CR** or **ENTER** key.
4. After you get the READY message, type in a string of different characters. The modem should echo the same characters back to your terminal.

Did the READY message and the proper characters appear?

Yes No

010

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

- Verify that the local modem has power by checking for any lit indicators.
- Verify that the modem's communication cable is securely connected at each cable end.
- Reset the local modem by switching the modem power off and then on.

(Step 010 continues)

010 (continued)

- If this is a new installation, verify that the communication cable is attached to the proper 3174 AEA port and goes to the proper modem destination.
- If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals are the same at each cable end.) See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
- If this is a new installation, verify that the modem transmission speed agrees with the 3174 AEA customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *3174 Planning Guide* question numbers 733 and 734 and verify the responses. Select Test 12, Option 2 (Display Status Summary) and check that the attached port is switched, and the Station line (v p h) agrees with customizing. Check that the communication cable goes to the proper destination. From an ASCII terminal, use the Menu Call sequence as before in step 005 to return to the Connection Menu, and then enter test mode.
- Verify that the local modem switch settings are properly set for the attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-297.
- Check for communication cable defects.

Note: The wrap test through the cable can be run if you are able to get a cable matcher connector for the wrap plug. This connector allows the connecting of the wrap plug with the cable connector. This item can be ordered from vendor catalogs.

- If the modem is IBM, you may be able to isolate by running the modem self test. The Hayes modem can be tested only from a working 3174 or a terminal. If modem self-testing is not available, tell the customer that the modem can be defective.

011

The following test requires you to enter the phone number of the remote modem. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, causes the remote phone/modem to ring and then establish a connection path to the remote terminal. The local modem then shows the DTR, DSR, and CD (IBM), or MR, TR, and CD (Hayes) indicators in the on condition.

- The format for dialing with the AT command is shown in the following table. If additional command information and examples are needed, see the modem documentation.

Command	Description
ATD	Puts modem in dial function mode
T	Tone dialing
P	Pulse dialing
,	If the access code has a number (usually the number 9), then add a comma after the number. This allows a pause for the second dial tone. Each comma is a pause for 2 seconds.
-	The hyphen can be used to denote breaks between numbers.
;	After dialing, a semicolon allows the modem to go back to command mode. Sometimes other Access information is entered and then the connection can be completed.

- Press the Shift key and type in **ATD**
- Type in the remote modem's phone number after the ATD characters (for example, ATD9,,xxx-xxxx) and press the **CR** or **ENTER** key. Within 45 seconds, your terminal displays either a **CONNECT** or **NO CARRIER** message.

(Step 011 continues)

MAP 1040 (continued)

011 (continued)

Did you get the CONNECT message?

Yes No

012

(NO CARRIER or ERROR message)

Note: If a terminal/device is connected to the remote modem, the power must be on the terminal/device for the connection sequence to be successful.

- Reset the local modem by switching power off and then on.
- Retry the connection again; enter the dial sequence as described in the preceding step.
- You might be able to isolate your connection problem by listening to the modem speaker.

Following is the sequence of events at the local modem after you enter the dial sequence:

1. Dial tone.
 2. Dialing tones or clicks.
 3. Ringing, busy, or fast busy. To establish a connection, the remote modem must have DTR, DSR, and CD (IBM), or CD, TR, and MR (Hayes) indicators on. Also check for the correct phone number for the remote modem.
 4. Access time for the phone connection.
 - Connection—Wavering tone, then carrier indicator comes on at the local modem.
 - No connection—Operator voice to indicate wrong number or other information. Rings and no answer.
1. Use one or more of the following methods to check your communication line:
 - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
 - Use your local modem phone to dial another phone number whereby the other phone can be answered.
 - If a phone is not connected, have someone dial your location and listen for the rings at the local programmable modem speaker.
 2. If you are **not able** to talk to the other person, hear the rings, or the tone at the modem, then go to step 4 below.

If you are **able** to talk to the other person or hear the rings or the tone at the modem, do only step 3.
 3. The problem is most likely the path from your local modem phone line to the remote modem.

From another phone, dial your remote modem's number and verify that a tone is heard after the first ring.
- Select from the following the one that applies to your modem:
 - IBM modem—See the 5841/5842 *Guide to Operations*, GA27-3649.

The modem front panel switches can run a data wrap to the remote modem and back to the local modem. Do the "Remote Digital Loop Self Test."
 - Hayes modem—See the manufacturer's documentation.

The Hayes modem cannot run a data wrap to the remote modem and back to the local modem. The remote modem can be tested by way of a self test from a terminal attached to the remote modem.

(Step 012 continues)

012 (continued)

4. The problem is most likely from your local modem to the phone line.
 - Verify the phone wire and connections from the modem to telephone data jack.
 - Notify the customer that the modem might be defective.

013

This test allows data to be sent from the requesting terminal to another terminal/printer and must be visually inspected at the tested device for the correct characters. The characters are not shown at your terminal. **Because of the potential distance of the tested device, it is necessary to contact another person to verify the test results.** The tested terminal at the remote modem end should be able to enter characters and these characters should then be displayed at your terminal.

For this test to be successful, the 3174 customizing response parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.

- Type in a string of characters and verify characters appear at the receiving terminal/printer.

Did the other terminal/printer show the proper characters?

Yes No

014

Go to Step 020 on page 2-86.

015

- At the terminal at the remote modem end, type in a string of characters. These same characters should then be displayed at your terminal.

Did your terminal show the proper characters?

Yes No

016

Go to Step 020 on page 2-86.

017

- If the original customer problem is not repeatable, then you should do the following to check for a noisy communication line. The device can also cause this problem.
 1. Reenter test mode, select Test 12 Option 2. (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
 2. Check the AEA port line for excessive line errors. These errors are counted by the line counter. If the line counter log is has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
 3. Check for any status codes in the event log that pertain to the AEA port. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See “Test 1 Configuration B/C: Display Logs Menu” on page 2-166.
 4. Determine if this is the problem.
- If the problem is repeatable and if extra, missing, or unintelligible characters are being displayed, sessions are lost, or terminal key functions are not as expected, then:
 - Verify that the customer did not change 3174 customizing parameters, device setup options, host application, or host data stream.

(Step 017 continues)

MAP 1040 (continued)

017 (continued)

Was the problem isolated?

Yes No

018

- To continue problem isolation, you need the hardware group and the port number with which the terminal is communicating. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
- Use your support structure for aid.

019

- Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
-

020

(From steps 014 and 016)

Did the problem occur during customizing or installation?

Yes No

021

Go to Step 027 on page 2-88.

022

The problem can be either 3174 customizing, device setup options, a communication cable, or the failing device.

You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits. These four parameters must be correct and must match between the 3174 and the device.

The override settings allow you to change the 3174 customizing parameters and run the transmit test without performing 3174 customizing. This test does not permanently change customizing responses.

- Return to the 3174 Test Menu, select Test 2, then Option 4 (AEA Configuration).
- Find the following customizing responses and record their values for response number = xx in the following chart. See the *3174 Planning Guide* for the meaning of these values.

Transmit Test Setting	Customizing Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type might have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

- Display the setup menu, see the manufacturer's documentation or check with the customer.

Note: The 3174 does not support BLOCK operating mode and only supports 7 or 8 data bits as the data word length, depending on the configuration level. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

- Compare your setup menu options with the 3174 customizing and update your terminal setup menu, or you can match the options when the transmit test is performed in the following step.

(Step 022 continues)

022 (continued)

Did you find a mismatch between terminal setup and 3174 customizing?

Yes No

023

- Verify the other 3174 customizing questions and the failing device's other setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.
- If customizing is not the problem, go to Step 027 on page 2-88.

024

To do the override option, you must return to the AEA Port Tests menu. When you return to the menu, the switched line connection is dropped and you must repeat the connection sequence after you enter the proper transmit test parameters.

1. Return to the AEA Port Tests menu.
2. In the following chart, find the W, X, YY, ZZ and number that you should enter for these parameters.
3. Add the port, hardware group, and override option parameters, then press the **CR** or **ENTER** key. You should then get a READY message.
4. Do the dial connection sequence again by pressing the Shift key and then typing in **ATD** and the phone number information. The proper connection should return with a CONNECT message.
5. Type in a string of characters and ensure that they are displayed at the tested device.

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Odd	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Even	20 = DTR	
3 = 1200 bps	3 = None	80 = XON/XOFF (any)	
4 = 2400 bps	4 = Space	C0 = XON/XOFF (XON)	
5 = 4800 bps	5 = Mark		
6 = 9600 bps			
7 = 19 200 bps			

Did the terminal or printer show the proper characters?

Yes No

025

- The programmable modems have a large number of switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup options can be checked or changed by use of the AT commands. The local modem settings can be set from a 3174 terminal. If this 3174 has been newly installed, you need to check the modem options. See "Modem Specifications and Switch Settings" on page 2-297 for the specific parameter recommendations. Also see the manufacturer's documentation for the command parameters.

Go to Step 027 on page 2-88.

026

Note: You should be able to enter characters at the terminal at the remote modem and these characters should then be displayed at your terminal.

(Step 026 continues)

MAP 1040 (continued)

026 (continued)

- If needed, return to “MAP 1000: ASCII Problem Entry” on page 2-60.
-

027

(From steps 021, 023, and 025)

This modem test takes the transmitted data from the 3174, and the data is sent back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is a Hayes, disconnect the telephone jack from the modem or the wall plug.
2. Reset the local modem by switching power off and then on.
3. Return to the AEA Port Tests menu.
4. Add the port and hardware group information to option 3 (default settings). For ASCII terminals, press the **CR** or **ENTER** key.
5. When you get the READY message, press the Shift key and type in **ATS16=1**. The modem should then return with the CONNECT or O message.
6. Type in a string of characters. These same characters should be returned from the modem and displayed at your terminal.
7. To terminate the test, type in **ATS16=0** (uppercase characters).

Did the proper message and characters appear on your terminal?

Yes No

028

- Reinstall the telephone jack if it was disconnected.
- Tell the customer that the modem might be defective.

029

- From the following, select the one that applies to your modem:
- IBM modem—See the 5841/5842 *Guide to Operations*, GA27-3649.
- Hayes modem—See the manufacturer’s documentation.

The Hayes modem cannot run a data wrap to the remote modem and back to the local modem. The remote modem can be tested from its attached terminal.

- Reset the local modem before returning to the online system.
-

030

(From step 006)

Did the host problem occur after this AEA port had been working?

Yes No

031

- Verify the 3174 customizing questions and the failing device’s setup options.
- Go to Step 032.

032

(From step 031)

(Step 032 continues)

032 (continued)

The problem can be either the local modem, remote modem, modem cables, phone line, phones, or the 3174 customizing.

The following procedures are written for the IBM 5841/5842, and Hayes or other modems that support the AT command set. When the attachment is Micom or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation.

The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.

Are the modems the IBM 5841/5842, Hayes, or similar programmable modems?

Yes No

033

- If you have a Micom or compatible modem, see the manufacturer's documentation when the MAP steps require reference.

Go to Step 034.

034

(From step 033)

- If needed, enter test mode and follow the menu selections until the AEA Port Tests menu appears.
- Select Option 3, Transmit Data (Default Options) as shown in the following steps:

1. Add the port and hardware group information to Option 3 (Default Settings) and press the **CR** or **ENTER** key (ASCII).
2. After you get the READY message, type in a sequence of different characters. These same characters should echo back to your terminal.

Were the READY message and the proper characters displayed?

Yes No

035

The missing READY indicates that the AEA port did not properly communicate with the attached local modem. When this happens, the IBM modem DTR or Hayes TR indicator does not come on.

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

1. Verify that the local modem has power by checking for any lit indicators.
2. Verify that the local modem's communication cable is properly connected at each cable end.
3. If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals should be the same at each cable end.) See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
4. If this is a new installation, verify that the modem transmission speed agrees with the 3174 customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *3174 Planning Guide* question numbers 733 and 734, and verify the responses. Select Test 12, Option 2, Display Status Summary, and check that the attached port is switched, and the Station line (v p h) agrees with customizing. Check that the communication cable goes to the proper destination.
5. Verify that the local modem switch settings are properly set for the attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-297.

(Step 035 continues)

MAP 1040 (continued)

035 (continued)

6. Reset the local modem by switching the modem power off and then on.
7. Check for communication cable defects. See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.
Note: The wrap test can be run through the cable if you are able to get a cable matcher connector for the wrap plug. This connector allows the connecting of the wrap plug with the cable connector. This item can be ordered from vendor catalogs.
8. If the modem is IBM, you might be able to isolate the problem by running the modem self test. See the modem user's guide. The Hayes modem can be tested only from a working 3174 or a terminal. If modem self-testing is not available, tell the customer that the modem might be defective.
9. Use your support structure for aid.

036

This modem test takes the incoming transmitted data from the 3174 and the data is read back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is a Hayes, disconnect the telephone jack from the modem or the wall plug.
2. Type in **ATS16=1** (uppercase characters), and press the CR or ENTER key (ASCII terminal). After you get the **CONNECT** or **OK** message, type in a sequence of characters. These same characters should be displayed at your terminal.

Did the proper message and characters appear on your terminal?

Yes No

037

- Verify that the local modem switch settings are properly set for attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-297.
- Check for communication cable defects. See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.

Note: The wrap test can be run through the cable if you are able to get a cable matcher connector for the wrap plug. This connector allows the connecting the wrap plug with the cable connector. This item can be ordered from vendor catalogs.

- Reinstall the telephone jack if it was disconnected.
- Tell the customer that the local modem might be defective.

038

- Reinstall the telephone jack if it was disconnected.

The following test requires you to enter the phone number of the remote modem's phone. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, causes the remote phone/modem to ring and then establish a connection path to the remote ASCII host. The local modem then shows the DTR, DSR, and CD (IBM), or MP, TR, and CD (Hayes) indicators in the on condition.

The format for dialing with the AT command is shown below. If additional command information and examples are needed, see the modem documentation.

Command	Description
ATD	Puts programmable modem in dial function mode
T	Tone dialing
P	Pulse dialing
,	If the access code has a number (usually the number 9), then add a comma after the number. This allows a pause for the second dial tone. Each comma is a pause for two seconds.
-	The hyphen can be used to denote breaks between numbers.
;	After dialing, the semicolon allows the modem to go back to command mode. (Sometimes other access information is entered and then the connection can be completed.)

- Press the shift key and type in **ATD**.
- Type in the remote modem's phone number after the ATD characters (for example, ATD9,,xxx-xxxx), and press the **CR** or **ENTER** key (ASCII). Within about 45 seconds, your terminal indicates either a **CONNECT** or **NO CARRIER** message.

Did you get the CONNECT message?

Yes No

039

(NO CARRIER message)

- Retry the dial sequence a few times.
- You may be able to isolate your connection problem by listening to the modem speaker. Following is the sequence of events at the local modem speaker:

1. Dial tone.
2. Dialing tones or clicks.
3. Ringing or busy or fast busy. To establish a connection path to the host, the host must be enabled and ready to communicate. The remote modem should have DTR, DSR, and CD (IBM), or CD, TR, and MR (Hayes) indicators on. Verify the correct phone number.
4. Access time for the phone connection.
 - Connection—Wavering tone, then carrier indicator comes on at the local modem.
 - No connection—Operator voice to indicate wrong number or other information. Rings, no answer, and No CARRIER message at your terminal.

Continue the MAP flow if needed.

1. Use one or more of the following methods to check your phone communication line:
 - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
 - Use your local modem phone to dial another phone number whereby the other phone can be answered.
 - If a phone is not connected, have someone dial your location and listen for the rings at the local programmable modem speaker.

2. If you are **not able** to talk to the other person or hear the rings or the tone at the modem, then check the phone wire and connections from the modem to the wall data jack.

If you are **able** to talk to the other person or hear the rings or the tone at the modem, do only item 3.

(Step **039** continues)

039 (continued)

3. The problem is most likely the path from your local modem phone line to the remote modem.

From another phone, dial your remote modem's number and verify that a tone is heard after the first ring.

– Select from the following the one that applies to your modem:

- IBM modem—See the 5841/5842 *Guide to Operations*, GA27-3649.

The modem front panel switches can be set to run a data wrap to the remote modem and back to the local modem. Do the Remote Digital Loop Self Test.

- Hayes modem—See the manufacturer's documentation.

The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested by way of a self test from a terminal attached to the remote modem.

– Use your support structure for aid.

040

– Use the customer's logon procedure and try to communicate with the host.

Were you able to communicate with the host?

Yes No

041

- Verify if other users can establish a connection and communicate with this host.
- If this is a new installation, enter Test mode, and from the 3174 Test Menu, select Test 2 (Display Configuration Panels). Verify the 3174 customizing responses related to the modem setup option and switch settings.

Modem Setup Option and Switch Settings

The programmable modems have many switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup options can be checked or changed using the AT commands. The local modem options can be set from a 3174 terminal. The remote modem setup options are set from its attached terminal. If this 3174 is newly installed or you need to check the modem options, see "Modem Specifications and Switch Settings" on page 2-297 for the specific switch and parameter recommendations. Also, see the manufacturer's documentation for the command parameters.

– Use your support structure for aid.

042

1. Select Test 12, Option 2 (Display Status Summary). For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu.
2. Check the Status Summary status line for proper results. See Figure 2-85 on page 2-240.
3. Check the AEA port line for excessive line errors. These errors are counted by the line counter. If the line counter log is has more than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
4. Check for any status codes in the event log pertaining to the AEA port. (From the 3174 Test Menu, select Test 1, then Option 2, All Events Logged.) See "Test 1 Configuration B/C: Display Logs Menu" on page 2-166 and "3174 Event Log" on page 1-31.
5. Verify that the customer did not change customizing parameters, host application, or the host data stream.

Cable Information

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment specifications for EIA 232D require a cable between 1 and 15 meters (3 and 50 feet). The Asynchronous Emulation Adapter communication transmission speed range is 300 to 19.2 Kbps.

The EIA 232D cable to a modem has a connector at the 3174 and a connector at the modem. The cable signal leads are the same at each cable end (no crossover of wires). See "Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring" on page 2-130.

Was the problem isolated?

Yes **No**

043

Use your support structure for aid.

044

- Retry the failing operation after the problem is corrected. If the failure continues, return to "MAP 1000: ASCII Problem Entry" on page 2-60.
-

MAP 1050: 3278 (or equivalent) Terminal Failing to Communicate to an ASCII Host

Symptom Explanation	Conditions That Could Cause This Symptom
3278 (or equivalent) terminal customized to communicate to an ASCII Host	<ul style="list-style-type: none"> • Defective Asynchronous Emulation Adapter card. • Open or shorted wires in the communication cable. • Loose cable connectors. • Defective terminal. • Incorrect 3174 customizing. • Cable problems due to excessive noise • Defective I/O panel or cable.

CAUTION:

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

001

– Before using this MAP, you must check the following by getting the information from the customer or by running Test 12 and Test 3 (Display Status Summary). See “MAP 1000: ASCII Problem Entry” on page 2-60 and use the procedure in Step 003, then return here.

- Are only 3278-type terminals having a problem with the ASCII host?
- Does this AEA feature configuration also include attached ASCII terminals?
- Are the ASCII terminals also having a problem with the ASCII host?

Is the AEA feature configured to include both ASCII and 3278-type terminals?

Yes No

002

- ASCII only—You are in the wrong MAP. Go back to the Symptom/Action chart in MAP 1000.
- 3270 only—If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate the 3278-type terminal problem.
- 3270 only—Go back to the Symptom/Action chart in MAP 1000. Select the proper ASCII port attachment symptom and use the MAP to isolate the ASCII host problem.

003

Is the problem only with 3278-type terminals?

Yes No

004

Go back to the Symptom/Action chart and select the ASCII symptom to isolate the problem.

005

- If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate 3278-type terminal problems.
 - If a terminal does not get the Connection Menu, the problem is most likely due to improper 3174 customizing.
 - Use your support structure for aid.
-

Diagnostic Aids: Offline Tests

Offline tests are started from the 3174 operator panel and then controlled either from the operator panel or from the terminal connected to port 0 on HG 26. The terminal must be a 3278 or equivalent. The test monitor program (HG 80) is on the Utility diskette, which should be inserted into diskette drive 1. A copy of the Utility diskette can also be on a fixed disk (HG 03). Offline tests consist of three major types:

- Hardware Group Test Alls and Processor and storage tests (HG = 81, 82, 87)
- Hardware Group Basic Tests (HG = 01–52)
- Hardware Group Optional Tests (HG = 01, 02, 03, 08, 09, 11, 16, 17, 21, 22, 23, 26, 27, 31, 36, 37, 38, 39, 41, 51, 52, and 80)

Hardware Group Test Alls and Processor/Storage Tests

Hardware Group Test Alls are invoked by entering hardware group numbers 81, 82, or 87 at the Alt 1 IML 40 prompt or the test monitor 4001 prompt message. An optional test parameter can also be entered with the hardware group number that causes the selected test to loop, stop on error, or both. If an error occurs during these tests, it is saved in a test error log in machine storage unless it is a critical error, such as a machine check. If a critical error occurs, the test halts and a status code is displayed. If HG 81, 82, or 87 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 halts the test run, the error can be bypassed by use of the *continue* function (key in 1 and press **Enter**). The test continues with the next hardware group in the test run list. The test run list varies, depending on which Test All hardware group was selected, and which hardware groups are installed in the controller being tested. Table 2-2 is an example of the order tests would run on a 3174 Model 21R with two diskette drives, a Type 1 Communication Adapter, and a Terminal Adapter.

Table 2-2. Test Sequence for Model 21R

Test All 81	Test All 82 or Alt 2 IML	Test All 87
2X87	2X87	2X87
2X01	2X01	
2X02	2X02	
2X08	2X08	
2X11 (with wrap test)	2X11 (without wrap test)	
2X26 (with wrap test)	2X26 (without wrap test)	

Test All 81 (CSU): Hardware Group 81 verifies that the hardware in the controller is working correctly at customer setup (CSU) time. The following tests are performed by HG 81:

- Processor and storage
- Diskette drives 1 and 2
- Fixed disk drive
- All installed adapters
- Port wraps on the Terminal Adapter
- Communication Adapter cable wrap test
- Concurrent Communication Adapter cable wrap test
- token-ring adapter cable wrap test.

This test should be performed only at customer setup, because of the following special requirements:

- All external terminal cables must be disconnected from the Terminal Multiplexer Adapter (TMA) cards and the Terminal Adapter in the controller, except for the terminal connected to logical port 0 on HG 26. Do not disconnect the coaxial cables that connect the TMAs or FTAs to the Terminal Adapter.
- For models having a Communication Adapter or a Concurrent Communication Adapter, the communication interface cable must be attached to the Communication Adapter and disconnected from the modem, and the TEST/OPER switch on the cable must be set to TEST.
- If two diskette drives are present in the controller, the Utility diskette must be in diskette drive 1 and a valid 3174 diskette, such as a Control or DSL diskette, must be in diskette drive 2.
- For models having a token-ring adapter, the token-ring adapter cable must be connected to the adapter card and disconnected from the token-ring.

Test All 82 (Alt 2 IML): Test 82 is normally used after the controller has been installed and a failure has occurred. The following tests are performed by HG82:

- Processor and storage
- Diskette and fixed disk drives
- All installed adapters.

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

Test All 87: Test All 87 is normally used after the controller has been installed and a failure occurs. The following tests are performed by HG87:

- 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 entering a hardware group number 01–52 at the test monitor 4001 prompt message. These tests can be looped by use of an optional test parameter. Hardware Group Basic Tests (01-52) are run on individual adapters, such as the File Adapter or the Terminal Adapter. These tests are the same tests that are run when an Alt 2 IML is performed, or when HG 82 is run. The difference is that only one specific FRU is being tested. If an error occurs during a hardware group basic test, the test halts and a status code is displayed. Tests can be terminated by use of the *free* function (press **Enter**). The 4001 prompt message is displayed, and another test request can be entered.

Offline Tests

Hardware Group Optional Tests

Hardware Group Optional Tests are invoked by entering a hardware group number and a function number and/or a function parameter. These tests can be looped by entering an optional test parameter in front of the function number. They provide special test capabilities, such as communication cable wraps and port wraps. Hardware Group Optional Tests can be selected for the following:

- Diskette drives (HG = 01 or 02)
- Fixed disk drive (HG = 03)
- Timer (HG = 08)
- Operator panel (HG = 09)
- Communication Adapter (HG = 11)
- Channel Adapter (HG = 16)
- Enterprise Systems Connection Adapter (HG = 17)
- Asynchronous Emulation Adapter (HG = 21, 22, or 23)
- Terminal Adapter (HG = 26 or 27)
- Terminal Multiplexer Adapter/3299 (HG = 26 or 27)
- Fiber Optic Terminal Adapter (HG = 26 or 27)
- Token-ring adapter (HG = 31)
- ISDN Adapter (HG = 36, 37, 38, or 39)
- Concurrent Communication Adapter (HG = 51 or 52)
- Test monitor (see Note)

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 2-3 on page 2-99 lists all the test requests that can be entered. Test requests that start with hardware group numbers 01-52 can be entered only at the test monitor 4001 prompt message. Test requests that start with hardware group numbers 80, 81, 82, and 87 can be entered at either the Alt 1 IML 40 prompt or the test monitor 4001 prompt. Hardware groups 81, 82, and 87 are normally entered at the 40 prompt, because these hardware groups load the test monitor program and start a test run list. The hardware group number is the only required field in a test request entry. The test parameter, function number, and function parameter numbers are optional fields.

The test request format is: HG TP FN FP

Where:

- HG = Hardware group number (see Table 2-3 on page 2-99)
- TP = Test parameter (optional) (see Table 2-4 on page 2-101)
- FN = Function number (optional) (see Table 2-3 on page 2-99)
- FP = Function parameter (optional) (see Table 2-3 on page 2-99).

Table 2-3 (Page 1 of 2). Function Numbers and Function Parameters

HG	TP	FN	Description	FP	FP Description	Page
01	90-97		Diskette 1 Basic Tests			2-106
01	90-97	01	Diskette 1 Ready Test			2-108
01	90-97	02	Diskette 1 Media Surface Test			2-109
02	90-97		Diskette 2 Basic Tests			2-106
02	90-97	01	Diskette 2 Ready Test			2-108
02	90-97	02	Diskette 2 Media Surface Test			2-109
03	90-97		Fixed Disk 1 Basic Tests			2-106
03	90-97	31	Fixed Disk 1 Surface Scan			2-110
03	90-97	32	Fixed Disk 1 Defect Fix			2-110
03	90-97	33	Fixed Disk 1 Full Format			2-111
03	90-97	34	Display Fixed Disk 1 Defect Table			2-112
03	90-97	51	CSU Surface Scan			2-114
03	90-97	52	Write Bootstrap Loader			2-114
08	90-97		Timer Basic Tests			2-106
08	90-97	01	Read Timer			2-115
08	90-97	02	Set Timer			2-115
09	90-97		Operator Panel			2-116
11	90-97		Communication Adapter Basic Tests			2-106
11	90-97	01	Interface Wrap Test			2-118
11	90-97	02	Modem Wrap (external clock)			2-118
11	90-97	04	Modem RLSD/DSR Status (EIA 232D/V.35)			2-118
11	90-97	05	X.21 Wrap (external clock)			2-118
11	90-97	07	Type 1 Driver Static Test (NTT Japan)			2-118
16	90-97		Channel Adapter Basic Tests			2-106
16	90-97	01	Driver/Receiver Wrap Test			2-123
16	90-97	02	Channel Adapter Switch/Indicator Test			2-128
17	90-97		Enterprise Systems Connection Adapter Basic Tests			2-128
17	90-97	01	Enterprise Systems Connection Adapter Interface Wrap			2-128
17	90-97	02	Send Offline Sequence			2-129
21	90-97		Asynchronous Emulation Adapter Basic Tests			2-106
21	90-97	01	Driver/Receiver Wrap Test	00-07	Logical Port Number	2-130
22	90-97		Asynchronous Emulation Adapter Basis Tests			2-106
22	90-97	01	Driver/Receiver Wrap Test	00-07	Logical Port Number	2-130
23	90-97		Asynchronous Emulation Adapter Basic Tests			2-106
23	90-97	01	Driver/Receiver Wrap Test	00-07	Logical Port Number	2-130
26	90-97		Terminal Adapter Basic Tests			2-106
26	90-97	01	Terminal Adapter Port Wrap	00,08,16,24 ¹	TA Port Number	2-140
26	90-97	02	Term Mpx/3299-2, 3, or 32 Port Wrap	00-31	Logical Port Number	2-141
26	90-97	03	Terminal Path Test	00-31	Logical Port Number	2-141
26	90-97	04	CUT Display Exerciser	00-31	Logical Port Number	2-141
26	90-97	05	Terminal Adapter Wrap All			2-141
26	90-97	06	Terminal Mpx/3299-2, 3, or 32 Wrap All	00,08,16,24 ¹	TA Port Number	2-141
26	90-97	07	Printer Exerciser Test	00-31	Logical Port Number	2-141
27	90-97		Terminal Adapter Basic Tests			2-106
27	90-97	01	Terminal Adapter Port Wrap	00	TA Port Number	2-140
27	90-97	02	Term Mpx/3299-2, 3, or 32 Port Wrap	00-31	Logical Port Number	2-141
27	90-97	03	Terminal Path Test	00-31	Logical Port Number	2-141
27	90-97	04	CUT Display Exerciser	00-31	Logical Port Number	2-141
27	90-97	05	Terminal Adapter Wrap All			2-141
27	90-97	06	Terminal Mpx/3299-2, 3, or 32 Wrap All	00	TA Port Number	2-141
27	90-97	07	Printer Exerciser Test	00-31	Logical Port Number	2-141

Offline Tests

<i>Table 2-3 (Page 2 of 2). Function Numbers and Function Parameters</i>						
HG	TP	FN	Description	FP	FP Description	Page
31	90-97		Token-Ring Adapter Basic Tests			2-106
31	90-97	01	Cable Wrap Test			2-143
31	90-97	02	Adapter Wrap Test			2-143
31	90-97	10	Display Universal Address			2-143
36	90-97		ISDN Adapter Basic Tests			2-106
36	90-97	01	Test All Ports			2-145
36	90-97	02	Test Specified Ports	01, 02		2-145
36	90-97	03	Adapter/Cable Wrap Test	00, 01, 02, 03		2-145
37	90-97		ISDN Adapter Basic Tests			2-106
37	90-97	01	Test All Ports			2-145
37	90-97	02	Test Specified Ports	01, 02		2-145
37	90-97	03	Adapter/Cable Wrap Test	00, 01, 02, 03		2-145
38	90-97		ISDN Adapter Basic Tests			2-106
38	90-97	01	Test All Ports			2-145
38	90-97	02	Test Specified Ports	01, 02		2-145
38	90-97	03	Adapter/Cable Wrap Test	00, 01, 02, 03		2-145
39	90-97		ISDN Adapter Basic Tests			2-106
39	90-97	01	Test All Ports			2-145
39	90-97	02	Test Specified Ports	01, 02		2-145
39	90-97	03	Adapter/Cable Wrap Test	00, 01, 02, 03		2-145
41	90-97		Ethernet Adapter Basic Tests			2-149
41	90-97	01	Cable Wrap Test			2-149
41	90-97	02	Adapter Wrap Test	01-03	10BASE Cable Type	2-149
41	90-97	10	Display Universal Address			2-149
51	90-97		Concurrent Communication Adapter Basic Tests			2-106
51	90-97	01	Interface Wrap Test			2-118
51	90-97	02	Modem Wrap (external clock)			2-118
51	90-97	04	Modem RLSD/DSR status (EIA 232D/V.35)			2-118
51	90-97	05	X.21 Wrap Test			2-118
51	90-97	07	Type 1 Driver Static Test (NTT Japan)			2-118
52	90-97		Concurrent Communication Adapter Basic Tests			2-106
52	90-97	01	Interface Wrap Test			2-118
52	90-97	02	Modem Wrap (external clock)			2-118
52	90-97	04	Modem RLSD/DSR status (EIA 232D/V.35)			2-118
52	90-97	05	X.21 Wrap Test			2-118
52	90-97	07	Type 1 Driver Static Test (NTT Japan)			2-118
80		01	Display Test Log			2-151
80		02	Display Test Log – IML Drive			2-152
80		03	Reset Test Log – IML Drive			2-152
80		04	Display Hardware Configuration			2-152
80		05	Display FRU ID Table			2-153
80		06	Display Test Log Count/Time			2-151
80		07	Display Test Log Count/Time IML Drive			2-153
81	90-97		Test All (CSU Mode)			2-105
82	90-97		Test All (Installed Mode)			2-105
87	90-97		Processor/Storage Test			2-105

¹Port 24 on HG 26 is present only on the base planar board. It is not present if you have the 3270 Port Expansion Feature.

Test Parameters: Test parameters, defined in Table 2-4, are used to qualify a test request.

Table 2-4. 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 make any valid hardware group test run its test sequence continuously. This parameter is ignored for hardware group 80. This parameter is reset at the end of the test and must be reentered with each test request. To stop a test that is looping, press **Enter**.

Terminal Control: This parameter requests the test control program to switch control of the tests from the operator panel to the terminal connected to port 0 on HG 26. 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 halts and each error is displayed as it occurs. A *continue* function can be used to allow the test request to proceed (key in 1, press **Enter**). When running HG 81, 82, or 87 with stop on error off, the test control program collects each error in a log without halting, and presents all the errors at the end of the test.

Offline Tests

How to Load the Test Monitor

The Test Monitor is a part of the Utility microcode. The Utility microcode is contained either on a diskette or on a fixed disk. If you are using diskettes, see "Loading the Test Monitor from a Diskette." If you are using a fixed disk, see "Loading the Test Monitor from a Fixed Disk."

Loading the Test Monitor from a Diskette:

1. Insert the Utility diskette into diskette drive 1.
2. Press and hold **Alt 1**.
3. Press and release **IML**.
4. Release Alt 1.
5. 40 is displayed.
6. At 40:

For operator panel control

- a. Key in **80**
- b. Press **Enter**.
- c. 4001 is displayed.

For terminal control

- a. Key in **8094**
- b. Press **Enter**.
- c. Go to the terminal connected to port 0 on HG 26.
- d. 4001 is displayed.

Loading the Test Monitor from a Fixed Disk:

1. Press and hold **Alt 1**.
2. Press and release **IML**.
3. Release Alt 1.
4. 40 is displayed.
5. At 40:

For operator panel control

- a. Key in **0380**
Where:
 03 = Fixed disk
 80 = Load test monitor.
- b. Press **Enter**.
- c. 4001 is displayed.

For terminal control

- a. Key in **0380**
Where:
 03 = Fixed disk
 80 = Load test monitor.
- b. Press **Advance**.
- c. Key in **94**
- d. Press **Enter**.
- e. Go to the terminal connected to port 0 on HG 26.
- f. 4001 is displayed.

Terminal Control Test Menus

Terminal control of offline tests is performed on a 3278 or similar terminal connected to port 0 on HG 26 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 procedures for entering a test request on the test menus:

Method 1

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. Type in the HG number on the Select line of the Test Menu
3. Press PF8 or if no other options, go to step 7.
4. Type in the TP number on the Select line of the Test Parameters Menu. (Figure 2-4 on page 2-104).
5. Press PF8 or if no other options, go to step 7.
6. Type in the FN number and the FP number on the Select line of the Selectable Functions Menu (Figure 2-5 on page 2-105). See Table 2-3 on page 2-99.
7. Press **ENTER**.

Method 2

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. Type in the entire test request (HG TP FN FP) on the Select line of the Test Menu. See Table 2-3 on page 2-99.
3. Press **ENTER**.

If Method 1 is used, up to three menus are displayed:

- Diagnostic Test Menu – Displays the hardware groups that are installed (see Figure 2-3).
- Test Parameters Menu – Displays optional test parameters (see Figure 2-4).
- Selectable Functions Menu – Displays function numbers and function parameters (see Figure 2-5).

Depending on the hardware group that was selected from the first menu, different function numbers and function parameters are displayed on the Selectable Functions Menu. Some hardware groups do not have the third menu, because there are no assigned function numbers or function parameters.

The following menus are displayed if the controller under test has the hardware groups installed as shown on the Test Menu and HG 26 is the hardware group to be tested.

Offline Tests

```
_____ Diagnostic Test Menu _____ Panel 1 of 3

Key HG: Press PF8

HG Description          HG Description

01 Diskette 1 - 2.4MB
03 Fixed Disk 1 - 20MB
08 Timer
09 Operator Panel
17 ESCON Channel
26 Terminal Adpt
27 Terminal Adpt
31 Token Ring - 16MB
51 Tp 1 Concur. Comm

                        80 Test Monitor Functions
                        81 Test All - Setup Mode
                        82 Test All - Installed Mode

Select ==>26
4001 - Enter Request

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

Figure 2-3. Diagnostic Test Menu Example

If you enter **26** in the Select field on the Diagnostic Test Menu, the following Test Parameters panel appears:

```
_____ Test Parameters _____ Panel 2 of 3

Key TP: Press PF8

90 No Options - Default
91 Loop Request
92 Stop on Error
93 Loop, Stop on Error

Select ==> 26_
4001 - Enter Request

PF:7=Back  8=Fwd
```

Figure 2-4. Test Parameters Menu

If you enter **93** in the Select field on Test Parameters, the Selectable Functions panel appears as follows:

```

_____ Selectable Functions _____ Panel 3 of 3

Terminal Adapter

FN Description                FP Description
01 Terminal Adapter Port Wrap  PT Terminal Adpt Port 00,08,16
02 Term Mpx Adpt/3299 Port Wrap PT Logical Port 00-31
03 Terminal Path Test         PT Logical Port 00-31
04 CUT Display Exerciser      PT Logical Port 00-31
05 Terminal Adapter Wrap All  NR Not Required
06 Term Mpx Adpt/3299 Wrap All PT Base Port 00,08,16
07 Printer Exerciser          PT Logical Port 00-31

Function requirements
FN 01,02,05,06 - To insure a valid wrap, the cable(s) must be
                 disconnected from wrapped port(s).

Select ==> 2693_
4001 - Enter Request

PF:7=Back

```

Figure 2-5. Selectable Functions Menu Example

If HG 27 was selected for this panel instead of 26, the field PT Terminal Adpt Port would have a value of **00** and the field PT Base Port would have a value of **00**

How to Run Hardware Group Test Alls or Processor/Storage Test

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001:

For operator panel control

- a. Key in **81**, **82**, or **87**
- b. Press **Enter**.

For terminal control

- a. Key in **8194** or **8294**. and press **ENTER**.
- b. Go to the terminal connected to port 0 on HG 26.
- c. The selected test is in progress.

Note: The processor/storage tests (HG 87) cannot be selected under terminal control. Processor/storage can be selected only from the operator panel.

Offline Tests

How to Run Hardware Group Basic Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001, key in **HG TP**
Where:
HG = Hardware group (see Table 2-5 on page 2-107).
TP = Test parameter (optional) (see Table 2-6 on page 2-107).
3. Press **ENTER**; test execution begins.
4. One of the following status codes is displayed, where HG equals the hardware group being tested:
21HG = Test in progress
22HG = Test in progress
20HG = Test completed
29HG = Test failure

For all other status codes, see the *3174 Status Codes* manual.
5. To make another selection at 20XX, press **ENTER**; 4001 is displayed.

These examples assume the test monitor has been loaded.

To run a Terminal Adapter Test:

At 4001, key in **26** and press **ENTER**.

To loop a Terminal Adapter test:

At 4001, key in **2691** and press **ENTER**.

To run CSU tests:

At 4001, key in **81** and press **ENTER**.

To run CSU Tests/Terminal Control:

At 4001, key in **8194** and press **ENTER**.

Note: Only HGs 81, 82, and 87 can be selected at the Alt 1 IML 40 prompt. For all other hardware groups, an **80** must be entered first to obtain the 4001 prompt, as shown in the examples.

Table 2-5. Hardware Group Numbers (Basic Tests)

HG	Unit	HG	Unit
00	Invalid or unknown	27	Terminal Adapter
01	Diskette 1/File Adapter	27	Terminal Multiplexer Adapters
02	Diskette 2/File Adapter	27	Fiber Optic Terminal Adapter (FTA)
03	Fixed Disk 1	31	Token-Ring Adapter
04	Fixed Disk 2	36	ISDN Adapter
08	Timer	37	ISDN Adapter
09	Operator Panel	38	ISDN Adapter
11	Communication Adapter	39	ISDN Adapter
16	Channel Adapter	41	Ethernet Adapter
16	Channel Driver/Receiver	46	Encrypt/Decrypt Adapter
17	Enterprise Systems Connection Adapter	51	Concurrent Communication Adapter
21	Asynchronous Emulation Adapter	52	Concurrent Communication Adapter
22	Asynchronous Emulation Adapter	80	Test Monitor
23	Asynchronous Emulation Adapter	81	Test All CSU Mode
26	Terminal Adapter	82	Test All Installed Mode
26	Terminal Multiplexer Adapters	87	Processor/Storage
26	Fiber Optic Terminal Adapter (FTA)	99	Unassigned Hardware Group

Table 2-6. 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

Offline Tests

How to Run Diskette Drive Optional Tests

Two diskette drive optional tests can be performed on the 3174.

These tests should be performed at the controller because manual intervention is required to complete them successfully.

Function number 01: 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: The diskette media surface analysis test. This test is used to check for defective tracks and sectors on a diskette.

Diskette Drive Ready/Change Test (FN 01):

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. When 4001 is displayed, key in **HG01**
Where:
HG = 01 (to test diskette drive 1)
HG = 02 (to test diskette drive 2)
01 = Function number 01
3. Press **ENTER**, the test begins.
4. 4561, 4562, or 4563 is displayed. Make sure that a diskette is in the drive before proceeding.
5. One of two types of diskette drives is installed in the 3174. One type ejects the diskette slightly outward when the drive door is opened; the other type does not eject the diskette. Therefore, the status code displayed when you do the following action depends upon the type of diskette drive installed.

Open the diskette drive door; 4560 is displayed or the diskette is ejected outward and 4562 is displayed.
6. Remove and reinsert the diskette; 4562 is displayed.
7. Close the diskette drive door; 4563 is displayed.
8. Repeat steps 5 through 7 as many times as required to verify that the diskette drive is working correctly.

Note: If the status code does not change after you perform an action with the diskette drive, the diskette drive or the planar board is defective.
9. To select other tests, press **ENTER**; 4001 is displayed.

Diskette Drive Media Scan (FN 02):

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001, key in HG02
Where:
HG = 01 (to test diskette drive 1)
HG = 02 (to test diskette drive 2)
01 = Function number 01
3. Insert the diskette to be scanned into the selected diskette drive.
4. Press **ENTER**.
5. At 4565, key in 1 and press **ENTER**.
6. One of the following codes is displayed in the status indicators, where HG equals the diskette drive selected as the test drive:
21HG = Test in progress
22HG = Test in progress
4566 = Test completed (no defects found)
4567 = Test completed (defects found).
7. If 4567 is displayed, press **Advance** and record the additional data. See status code 4567 in the *3174 Status Codes* manual.
8. To continue testing at 4xxx, press **ENTER**; 4001 is displayed.

Offline Tests

How to Run Fixed Disk Drive Optional Tests

It is recommended that you run the fixed disk optional tests from a terminal. The panels displayed at the terminal give the same information as the operator panel, but the information is much easier to read from the terminal. See "How to Load the Test Monitor" on page 2-102.

Warning: Do not switch the 3174 power off until the selected function comes to a normal completion. Surface defects could occur with lost data if the 3174 were switched off during operation.

Six fixed disk drive optional tests can be performed on the 3174:

- Function number 31, Fixed Disk Surface Scan
- Function number 32, Fixed Disk Defect Fix
- Function number 33, Fixed Disk Full Format
- Function number 34, Fixed Disk Scan Defect Table
- Function number 51, CSU Surface Scan
- Function number 52, Write Bootstrap Loader.

Fixed Disk Surface Scan (FN 31): Verifies that no damage has been done to the media (especially after a physical relocation of a 3174).

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. When 4001 is displayed, key in **0331**
Where:
03 = Fixed disk hardware group number
31 = Run Surface Scan on the fixed disk.
3. Press **ENTER**.
4. One of the following codes is displayed:
23xx = Surface Scan Test in progress (xx = a number that decrements to 0).
4401 = SCAN complete; No new defects found.
4402 = SCAN complete; DEFECT FIX recommended.
4403 = SCAN complete; DEFECT FIX required.
4404 = SCAN complete; Full FORMAT required.
5. If any other status code appears, refer to *3174 Status Codes*.
6. To continue testing at 4xxx, press **ENTER**; 4001 is displayed.

Fixed Disk Defect Fix (FN 32): This function is used to assign alternate sectors/tracks for those found defective by the surface scan test. Recoverable data is transferred to an alternate sector/track. This test requires a completed surface scan as input. If the surface defect fix is invoked but surface scan has not been executed, the surface scan is invoked automatically.

1. If you haven't already done so, load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. When 4001 is displayed, key in **HG32**
Where:
03 = Fixed disk hardware group number
32 = Fix defects on the fixed disk.
3. Press **ENTER**.

4. One of the following codes is displayed:

23xx - 01HG = DEFECT FIX in progress (xx = The cylinder containing the sectors being fixed)

4408 - 01HG = DEFECT FIX complete; No new defects found.

4409 - 01HG = DEFECT FIX complete; All defects resolved.

4410 - 01HG = DEFECT FIX complete; IML Select Utility required. See "How to Perform Media Management" in the *3174 Utilities Guide*.

4411 - 01HG = DEFECT FIX complete; Data restoration required. See "Restoring Your Data" in Chapter 2 of *3174 Status Codes*.

4411 - 02HG = DEFECT RESTORATION required; Key in 1, press **ENTER** to display the Restore Data List, and press **ENTER** to quit. See the "Restore Data List" in Chapter 2 of *3174 Status Codes*.

4412 - 01HG = DEFECT FIX complete; Full FORMAT required.

5. If any other status code appears, refer to *3174 Status Codes*.6. To continue testing at 4xxx, press **ENTER**; 4001 is displayed..

Fixed Disk Drive Full Format (FN 33): Erases the disk and maps around any defects on the disk. After the test has been run, 3174 microcode must be copied onto the fixed disk.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.

2. When 4001 is displayed, key in **0333**

Where:

03 = Fixed disk hardware group number

33 = Format the fixed disk.

3. Press **ENTER**.

4. 4415 Warning message is displayed ("Full Format will erase data").

a. To abort the test, press **ENTER**; 4001 is displayed.

b. To FORMAT, key in **2** and press **ENTER**.

5. One of the following codes is displayed on the panel.

23xx = FULL FORMAT in progress (xx = a number that decrements to 0).

4416 = FULL FORMAT complete. Data restoration is required. See "Restoring Your Data" in Chapter 2 of *3174 Status Codes*.

4417 = FULL FORMAT terminated; Drive replacement required.

6. If any other status code appears, refer to *3174 Status Codes*.7. To continue testing at 4xxx, press **ENTER**; 4001 is displayed.

Offline Tests

Display Fixed Disk Defect Table (FN 34): Displays the Fixed Disk Scan Defect Table. You must run Function 31 before running Function 34.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.

Note: You must run Function 31 before you select Function 34.

2. When 4001 is displayed, key in **0334**

Where:

03 = Fixed disk hardware group number

34 = Display the Fixed Disk Defect Table.

3. Press **ENTER**.

4. See the Fixed Disk Scan Defect Table, Figure 2-6 on page 2-113, for a description of the results of Function 34.

5. One of the following codes is displayed:

4420 = Defect Table complete

4421 = Defect Table missing. Run Surface Scan (Function 31).

6. If any other status code appears, refer to *3174 Status Codes*.

7. To continue testing at 4xxx, press **ENTER**; 4001 is displayed.

Scan Defect Table Output: In operator panel mode, only the summary line is displayed. The example below is what would appear on the operator panel. (The advance key must be pressed to display each 2 bytes.)

```
4420 01HG 0008 0005 0002 0002 0001 0007 0000 0001 0003.
```

```
4420 = Status Code
```

```
01 = Qualifier
```

```
HG = Hardware Group
```

```
0008 = Total entries
```

```
0005 = count of new defects not previously resolved
```

```
0002 = count of defects containing data
```

```
0002 = count of defects in System area
```

```
0001 = count of defects in Manufactures Defect Table
```

```
0007 = count of hard defects
```

```
0000 = count of defects from format Utility termination
```

```
0001 = count of defects successfully recovered
```

```
0003 = count of defects successfully relocated
```

Figure 2-6 on page 2-113 shows how the Scan Defect Table appears on a terminal.

```

_____ Fixed Disk 1 Defect Table _____
Total entries: tttt
          New  Used  Sys  OMD  Hrd  RNS  Rec  Rel
Totals   0005 0002  0002  0001  0007  0000  0001  0003

Cyl Hd  Sct
0001 01 08      1   1   1   0   1   0   0   1
0003 00 06      1   0   1   0   1   0   0   1
0005 03 01      1   1   0   0   1   0   0   0
002B 03 0F      0   0   0   0   1   0   0   0
0072 00 10      1   0   0   0   0   0   1   0
010C 02 08      1   0   0   0   1   0   0   1
014F 00 11      1   0   0   0   1   0   0   1
0263 01 04      1   0   0   0   1   0   0   1

PF: 3=Quit  7=Back  8=Fwd

```

Figure 2-6. Display Scan Defect Table in Terminal Mode (example)

Where:

tttt = count of all defects found
 Cyl = Cylinder
 Hd = Head
 Sct = Sector
 New = count of new defects not previously resolved
 Used = count of defects containing data
 Sys = count of defects in the System area
 OMD = count of defects in the Manufacturers Defect Table
 Hrd = count of hard defects
 RNS = count of defects from format Utility termination
 Rec = count of defects successfully recovered
 Rel = count of defects successfully relocated

Offline Tests

CSU Surface Scan (FN 51): Runs automatically during a "Test 81 (CSU)" when a 3174 or a fixed disk is installed. It can also be used to test a new fixed disk. This test checks for several files in the system area that may not be present on a new fixed disk drive. If these files are not found, they are added to the system area and a surface scan is run. If the files are present, this function just does a surface scan. Customer data that is on the disk is not affected. This test (FN 51), or Test 81 (CSU), must be run before the fixed disk is initialized; otherwise the 3174 Copy Utility does not recognize the fixed disk as being installed.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. When 4001 is displayed, key in **0351**
Where:
03 = Fixed disk hardware group number
51 = Fixed disk surface scan.
3. Press **ENTER**.
4. One of the following codes is displayed:
23xx = Surface Scan Test in progress (xx = a number that decrements to 0).
4401 = SCAN complete; No new defects found.
4402 = SCAN complete; DEFECT FIX recommended.
4403 = SCAN complete; DEFECT FIX required.
4404 = SCAN complete; Full FORMAT required.
5. If any other status code appears, refer to *3174 Status Codes*.
6. To continue testing at 4xxx; press **ENTER**, 4001 is displayed.

Write Bootstrap Loader (FN 52): Checks for several files in the system area that may not be present on a new fixed disk. If these files are not found, they are added to the system area. Customer data that is on the disk is not affected.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. When 4001 is displayed, key in **0352**
Where:
03 = Fixed disk hardware group number
52 = Write bootstrap loader.
3. Press **ENTER**.
4. One of the following codes is displayed:
23xx = Write Bootstrap Loader Test in progress.
4430 = Write Bootstrap Loader Test complete.
4431 = Write Bootstrap Loader Test complete; Full Format required.
4432 = Write Bootstrap Loader Test complete; Select IML Source required.
5. If any other status code appears, refer to *3174 Status Codes*.
6. To continue testing at 4xxx; press **ENTER**, 4001 is displayed.

How to Read and Set the Timer

These tests enable you to set and read the timer counter and set and read the day counter. The timer runs from 00:00 hours and minutes to 23:59 hours and minutes. The day counter runs from 0000 days to 0255 days. When the timer counter goes from 23:59 to 00:00, the day counter is increased by 1. When the day counter reaches 0255, it returns to 0000 when the time of day passes 23:59. Valid timer values are 0000 to 2359. Valid day counter values are 0000 to 0255.

Note: The timer and day counters are reset to zeros when the controller is switched off and on. This procedure has to be performed each time a POR occurs. If it is not performed, the timer defaults to starting time 00:00 and the day counter starts at 0000.

How to Read the Timer (FN 01):

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001, key in **0801**
3. Press **Enter**.
4. The day counter is displayed. If terminal control is being used, the day and the time are displayed at the same time. Go to step 6.
5. Press **Advance**.
6. The time of day is displayed as HRMN.
7. To make another selection, press **ENTER**; 4001 is displayed.
8. If any other status code is displayed, refer to *3174 Status Codes*.

How to Set the Timer (FN 02):

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001, key in **0802**
3. Press **ENTER**; 4542 is displayed.
4. Key in the day, any value from **0000** to **0255**. If terminal control is being used, the day and the time of day can be entered at the same time. Enter all eight digits without spaces, and press **ENTER**, then go to Step 8.
5. Press **Advance**.
6. Key in the time, any value from 0000 to 2359 in the format HRMN
Where:
HR = Hours
MN = Minutes.
7. Press **ENTER**. 2008 is displayed.
8. To make another selection, press **ENTER**; 4001 is displayed.
9. If any other status code is displayed, refer to *3174 Status Codes*.

Offline Tests

How to Run the Operator Panel Test

This test verifies that the keypad, function push buttons, indicators, and status indicators are functioning correctly on the 3174 operator panel. Because manual intervention is required at the operator panel, the procedure below shows this test being performed only at the operator panel.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. At 4001, key in **09** and press **ENTER**. 4505 is displayed in the Status indicators.
3. Press the listed keys on the operator panel keypad and verify that the correct character is displayed in the four Status indicators.

Key Pressed	Result
0-9	0-9
Clear	E
Alt 1	H
Alt 1 (again)	- (dash)
Alt 2	L
Alt 2 (again)	blank
Advance	P

4. Observe the yellow and green indicators on the operator panel, and press any numeric key 0-9:
 - a. Yellow indicator goes off.
 - b. Green indicator comes on for about 1.5 seconds.
 - c. About five seconds later, the yellow indicator comes on.
5. Press **ENTER**.
6. If successful-completion message 2009 is displayed, press **ENTER** for the 4001 prompt message.
7. If not successful, see "MAP 0110: Operator Panel Isolation" on page 2-7.

How to Run Communication Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. The Models 21R, 22L, and 23R have a Type 1 Communication Adapter on the planar board. Check card locations 11 to 15 for one of the following:

9263 = Type 1 Concurrent Communication Adapter

9267 = Type 2 Concurrent Communication Adapter

Note: Table 2-7 and the paragraphs following "Communication Adapter Function Number Descriptions" on page 2-118 describe the purpose of each function number and any conditions that have to be met before a particular function number can be used.

3. At 4001, key in **HG FN**
where

HG = 11 for the Communication Adapter on the planar board

HG = 51 for the CCA in the lowest card location starting with location 11

HG = 52 for the second CCA

FN = Function number (select from Table 2-7).

4. Press **Enter**; the test begins.
5. One of the following status codes is displayed in the status indicators, where HG equals the hardware group being tested:

21HG = Test in progress

22HG = Test in progress

20HG = Test completed

3030 = Test failed

For codes 29HG, 3030, 4510 to 4514, and all other status codes, see the *3174 Status Codes* manual.

6. To make another selection or to terminate the test, press **ENTER**.

Table 2-7. Function Numbers (Communication)

FN	Description	Condition
01	Interface Wrap Test	<ul style="list-style-type: none"> • For EIA. Set the interface cable TEST/OPER switch to TEST or use wrap plug part 6423419. • For CCITT V.35. See "CCITT V.35 Cable Wrap Test (Three TEST/OPER Switches)" on page 2-119. • For X.21. Set the interface cable TEST/OPER switch to TEST or use wrap plug P/N 6423420.
02	Modem Wrap	<ul style="list-style-type: none"> • Set the interface cable TEST/OPER switch to OPER. • The modem must be wrappable and power switched on.
04	Type 1 Interface Status Test	<ul style="list-style-type: none"> • Set the cable TEST/OPER switch to OPER. • The modem must be attached and power switched on.
05	Type 2 Interface Clock Test.	<ul style="list-style-type: none"> • Set the cable TEST/OPER switch to TEST.
07	Type 1 Driver Static Test	<ul style="list-style-type: none"> • Disconnect the interface cable from the modem. • Set the TEST/OPER switch to OPER.

Offline Tests

Communication Adapter Function Number Descriptions: The following paragraphs describe the function numbers for Type 1 (EIA 232D/V35) and Type 2 (X.21) Adapters.

External Communication Wrap (FN 01): This test provides a data wrap of the driver/receiver portion of the Type 1 or Type 2 adapters. With the external interface cable connected to the 3174 and disconnected from the modem, the data is wrapped through the TEST/OPER switch on the interface cable. A wrap plug for each adapter is available as a branch office tool that can be used in place of the interface cable. Follow these procedures to ensure a valid wrap test:

For the Type 1 Adapters (EIA 232D/CCITT V.35): Connect the external interface cable to the 3174 and disconnect it from the modem and set the TEST/OPER switch to TEST, or install wrap plug (P/N 6423419) on the Communication Adapter.

For Type 2 Concurrent Communication Adapter (X.21): Connect the external interface cable to the 3174 and disconnect it from the modem and set the TEST/OPER switch to TEST, or install wrap plug P/N 6423420 on the Concurrent Communication Adapter card.

Notes:

1. Function number 01 runs automatically when customer setup tests (HG 81) are performed.
2. This wrap test may not fail if only one of the Signal A or Signal B lines is broken (V.35 and X.21).

Modem Wrap (FN 02): This test provides a data wrap through the external modem. This test is valid for both Type 1 and Type 2 adapters. The following conditions must be met to ensure a valid wrap test:

- The modem must be wrappable. (See the documentation for your modem.)
- The external interface cable must be connected to the 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 *3174 Status Codes*. This test is only for the Type 1 adapters (EIA 232D/CCITT V.35). To ensure a valid test, the external interface cable must be connected to the 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 you press the ENTER key.

Type 2 Interface Clock Test (FN 05): This test provides a data wrap through the attached modem cable using the modem clock. This test is only for the Type 2 adapters (X.21). To ensure a valid test, the external interface cable must be connected to the adapter and to the modem. The TEST/OPER switch on the cable is set to TEST. This test cannot be run on the Communication Adapter (HG 11).

Type 1 Driver Static Test NTT Japan (FN 07): 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), and 'Test'. This test is valid only for the Type 1 adapters. Status code 4514 indicates the interface leads are at their logical ON condition. When the test is completed, press the ENTER key to end the test.

CCITT V.35 Cable Wrap Test (Three TEST/OPER Switches): This procedure is used with the CCITT 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 FN 01 is used in conjunction with the TEST/OPER switch. Before starting the wrap test, see Figure 2-7 and Table 2-8 for the switch settings of the TEST/OPER switches. The cable should be disconnected from the modem when running this test. If any other switch setting is used, the wrap test fails.

Table 2-8. CCITT 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

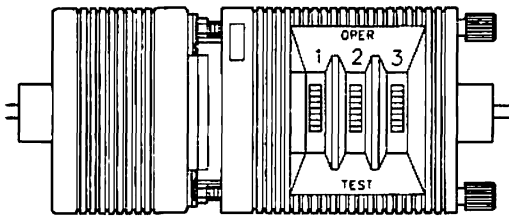
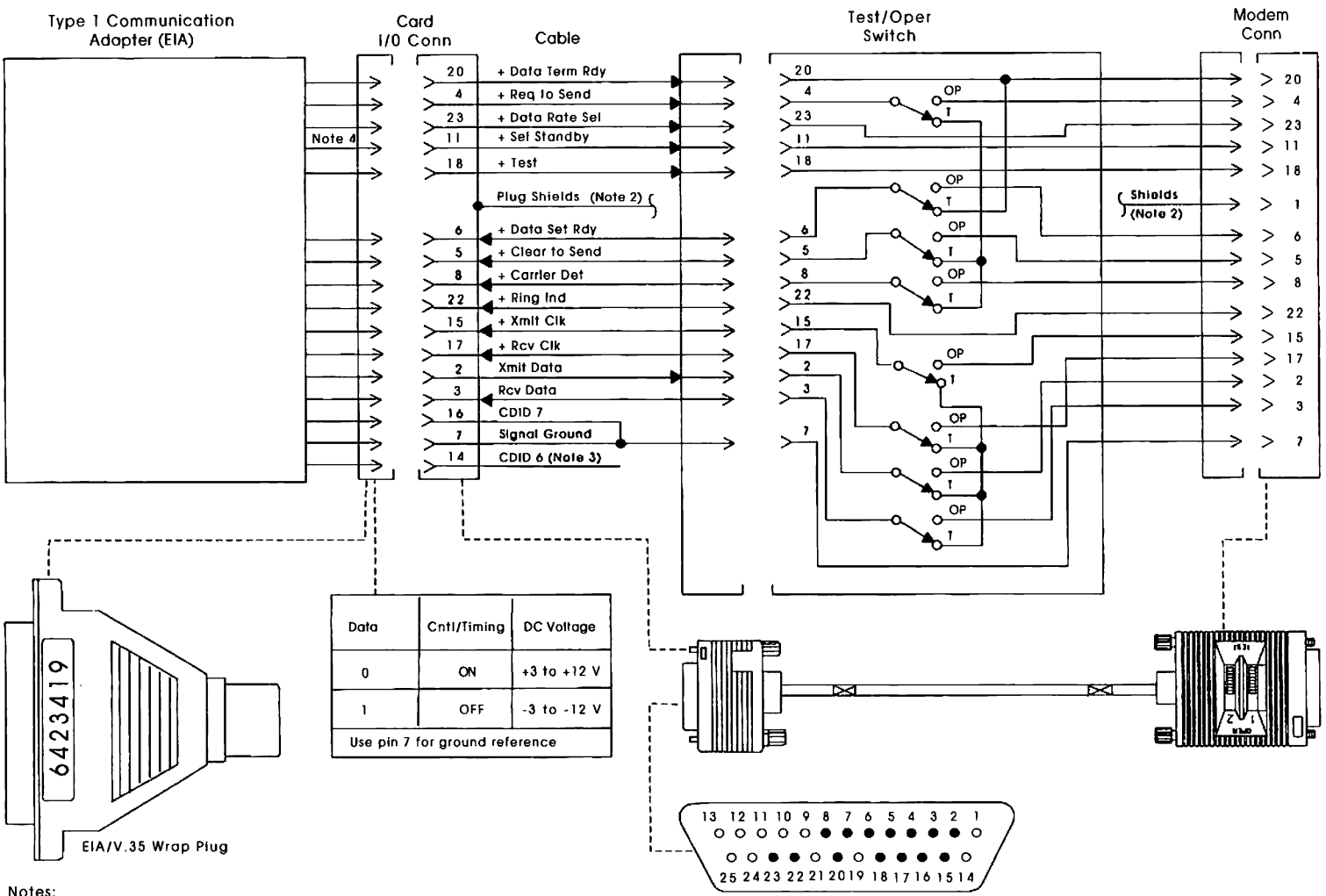


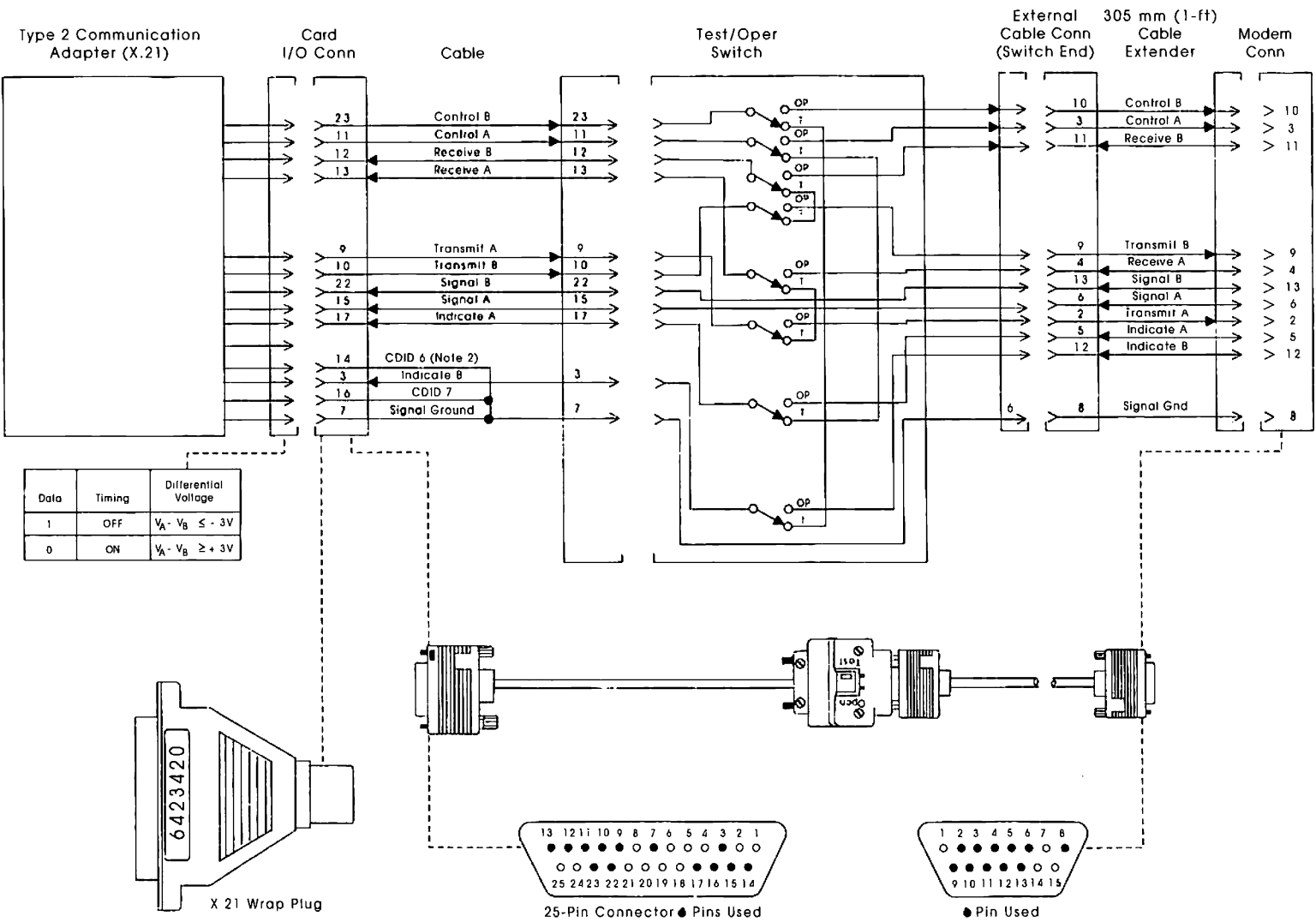
Figure 2-7. CCITT V.35 Three-Switch TEST/OPER Switch



Notes:

1. 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. In addition, the interface lines Test to Ring Ind are wrapped by the wrap plug.
2. The cable shields are connected to pin 1 at the modem end and to the shell at the adapter end.
3. Pins 14 and 16 are wired together in the wrap plug.
4. Not present on adapters currently shipped with the 3174.

Figure 2-8. EIA 232D Communication Line Flow (Cable and Wrap Plug)

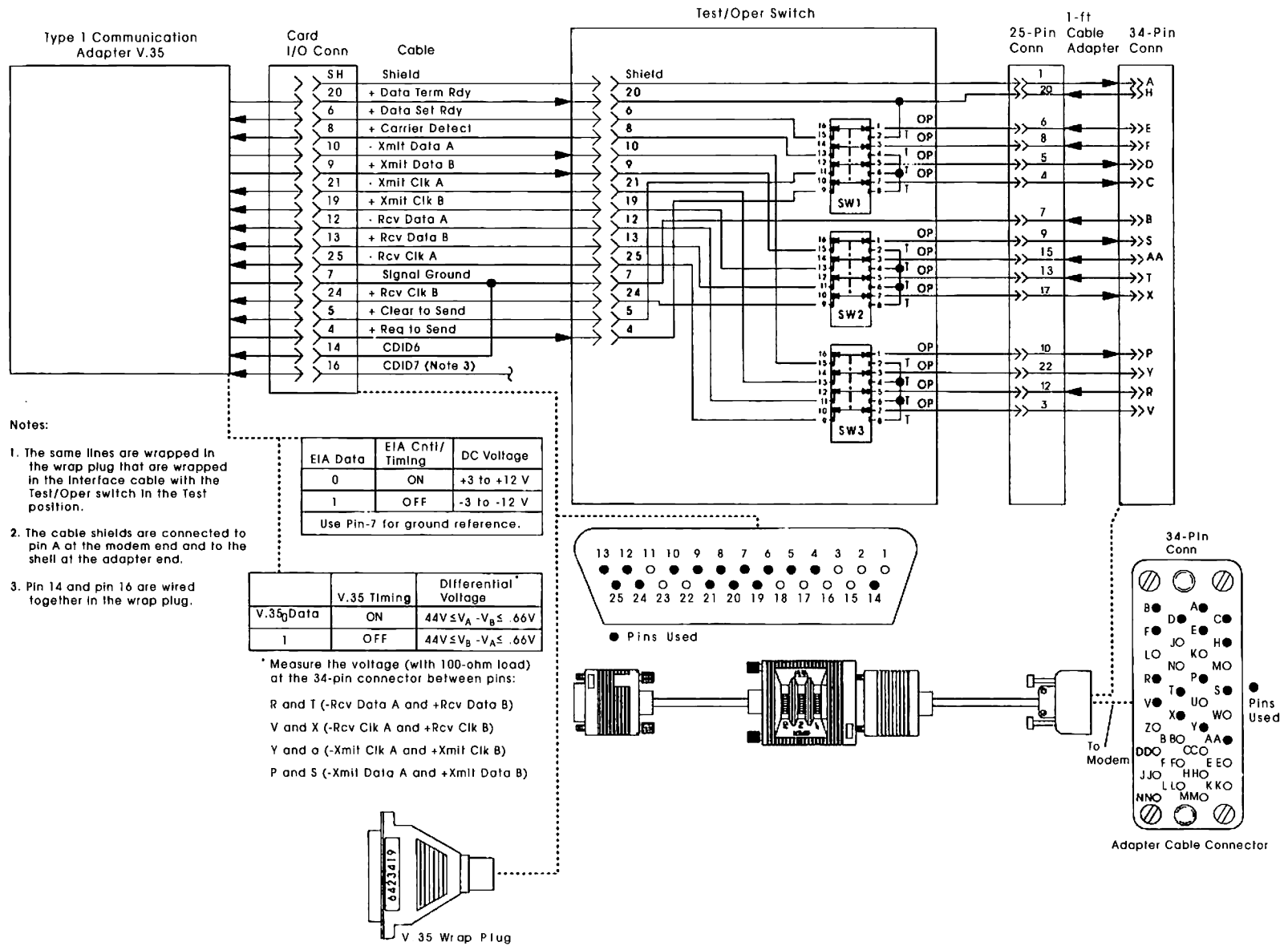


Notes:

- 1 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
- 2 Pin 14 (CDID 6) is not wired to pin 7 in the wrap plug

Figure 2-9. X.21 Communication Line Flow (Switched and Nonswitched) (Cable and Wrap Plug)

Figure 2-10. V.35 Communication Line Flow (Cable and Wrap Plug)



How to Run the Channel Driver/Receiver Wrap Test (FN 01)

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. If the 3174 is a channel-attached, go offline (indicator on); then set the Power Control switch to the Local position before switching off power. See “How to Take the 3174 Model 21L Offline” on page 2-290.

The **Channel Driver/Receiver Wrap Test** checks the data path from the channel adapter through the driver/receiver circuitry to the Bus In and Tag In positions on the bus/tag tailgate assembly. The Bus Out and Tag Out data paths from the driver/receiver to the tailgate are not tested. The following conditions must be met before you can perform the wrap test:

- The controller must be offline from the host system.
- The bus terminator and the tag terminator must be installed in the Bus Out and Tag Out positions, respectively.
- The bus wrap and tag wrap blocks must be installed in the Bus In and Tag In positions, respectively.
- The priority switches must be set to High or Low priority.

Perform the wrap test as follows:

1. Take the controller offline.
2. Disconnect the channel interface cables; see “How to Disconnect the Bus and Tag Cables” on page 2-292 and Figure 2-11 on page 2-125. Install:

The Tag terminator (P/N 2282676) in position J1 (Tag Out)

The Bus terminator (P/N 2282675) in position J2 (Bus Out)

The Tag wrap block (P/N 4299873) in position J3 (Tag In)

The Bus wrap block (P/N 6246339) in position J4 (Bus In).

Note: These part numbers are for standard channel connectors. For the wrap block for internal channel cables, use P/N 53F7816. For the internal channel terminator block use P/N 6473048.

3. Record the positions of the priority switches; set the switches to High or Low priority. See “Priority Switches” on page 4-2.
4. Load the test monitor. See “How to Load the Test Monitor” on page 2-102.
5. At 4001, key in **1601**
6. Press **Enter**.
7. One of the following status codes is displayed in the status indicators:
 - 2116 = Test in progress
 - 2216 = Test in progress
 - 2016 = Test completed
 - 3011 = Test failed (Go to “Wrap Test Analysis” on page 2-124.)

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

8. To continue testing, press **Enter**; 4001 is displayed.
9. To exit this test, perform the following steps.
 - a. If changed, set the priority switches to their original positions.
 - b. Remove the wrap blocks.
 - c. If the terminator assemblies had to be installed in this controller, remove them.
 - d. Install the channel interface cables.
 - e. Place the controller online; see “How to Place the 3174 Model 21L Online” on page 2-290.

Offline Tests

Wrap Test Analysis: Status code 3011 indicates that a line or lines in the data path have failed. Perform the following steps to identify which lines are failing:

1. Press **Advance** and record the numbers as they appear in the Status indicators.
2. Status code 3011 is displayed in the following format:

3011 0316 TYPE LOCA XXYY

Where:

3011 = Status code

0316 = Qualifier and hardware group

TYPE = FRU type number

LOCA = FRU location

XXYY = Failing lines:

XX = 1X, 2X, or 3X = the first failing line

YY = 1Y, 2Y, or 3Y = the next failing line.

YY = 00 Indicates that only one line is failing, or the test reported one line failing. The first failing line indicated by XX must be repaired and the wrap test has to be performed again until the test runs with no failures.

Use Table 2-9 and Table 2-10 on page 2-125 to identify the failing lines. Repair the failing lines. Visually inspect the cable connectors, I/O block, or terminators for bent or broken contacts.

Note: If you were sent here from MAP 0920, return to the MAP 0920 and continue with problem isolation.

Example of a wrap test failure, where

XXYY = 2100 = J06 to B10 Tag Req In to Adr Out.

XXYY = 1732 = G12 to B12 Bus In/Bus Out 7
G08 to G10 Tag Dat IN/Dat Out

Table 2-9. Wrap Test Analysis Chart A

XXYY	J4	J4	Name of Line
10	J04-to-	D04	Bus In/Bus Out 0
11	G05-to-	B05	Bus In/Bus Out 1
12	J06-to-	D06	Bus In/Bus Out 2
13	G08-to-	B08	Bus In/Bus Out 3
14	J09-to-	D09	Bus In/Bus Out 4
15	G10-to-	B10	Bus In/Bus Out 5
16	J11-to-	D11	Bus In/Bus Out 6
17	G12-to-	B12	Bus In/Bus Out 7
18	G03-to-	B03	Bus In/Bus Out P
19	J13-to-	D13	Bus In/Out Mko

Table 2-10. Wrap Test Analysis Chart B

XX/YY	J3	J3	Name of Line
21	J06-to-	B10	Tag Req In/Adr Out
22	B03-to-	J13	Tag Opl In/Opl Out
23	B05-to-	B12	Tag Adr In/Sup Out
24	D04-to-	D11	Tag Sta In/Com Out
25	D06-to-	D13	Tag Srv In/Srv Out
26			Reserved
27			Reserved
30	B08-to-	D09	Tag Sel In/Sel Out
31	J11-to-	G12	Tag Dis In/Hld Out
32	G08-to-	G10	Tag Dat In/Dat Out
33	G05-to-	J04	Tag Mtr In/Mtr Out
34			Reserved
35			
36			
37			

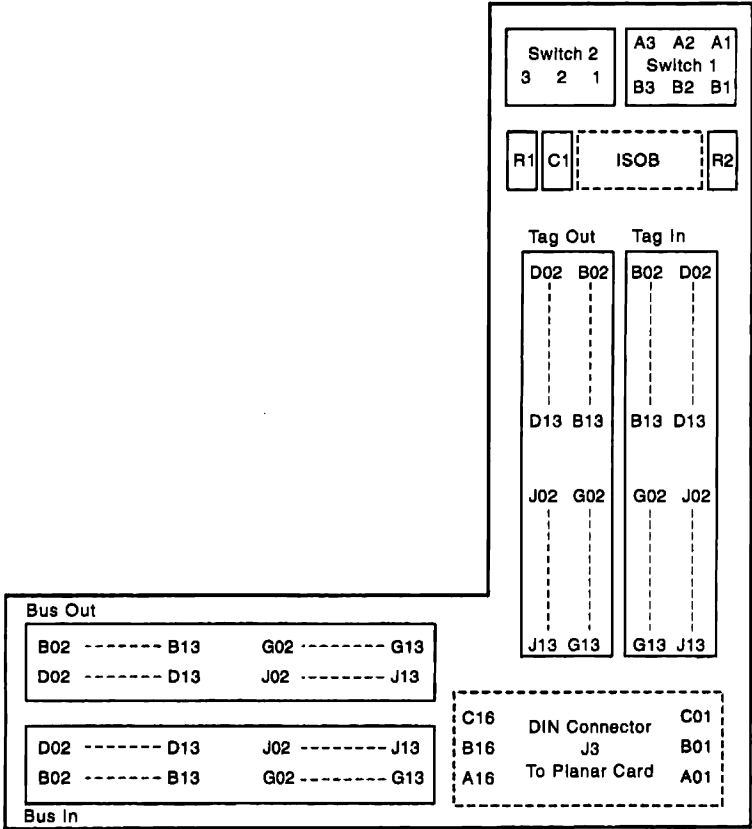


Figure 2-11. Tailgate Assembly Pin Locations

Offline Tests

Table 2-11. Internal Channel Terminator Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Bus Out 7	40	Bus In 7 rtn
2	Bus Out 7 rtn	41	Bus In 7
3	Bus In 5	42	Bus Out 6 rtn
4	Bus Out 5 rtn	43	Bus Out 6
5	Bus In 0	44	Bus In 3 rtn
6	Bus In 0 rtn	45	Bus In 3
7	Bus Out 1	46	Bus In P rtn
8	Bus Out 1 rtn	47	Bus In P
9	Bus Out P	48	Bus Out 2 rtn
10	Bus Out P rtn	49	Bus Out 2
11	Meter In	50	Opl Out rtn
12	Meter In rtn	51	Opl Out
13	Req In	52	Disc In rtn
14	Req In rtn	53	Disc In
15	Data In	54	Svc In rtn
16	Data In rtn	55	Svc In
17	Adr Out	56	Sel In rtn
18	Adr Out rtn	57	Sel In
19	Sel Out	58	Opl In rtn
20	Sel Out rtn	59	Opl In
21	Bus Out 4	60	Mark In rtn
22	Bus Out 4 rtn	61	Mark In
23	Bus In 4	62	Bus Out 5 rtn
24	Mark out	63	Bus Out 5
25	Bus In 2	64	Bus In 6 rtn
26	Bus In 2 rtn	65	Bus In 6
27	Bus Out 3	66	Bus In 1 rtn
28	Bus Out 3 rtn	67	Bus In 1
29	Mark Out	68	Bus Out 0 rtn
30	Mark Out rtn	69	Bus Out 0
31	Clock Out	70	Clk Out
32	Data Out rtn	71	Hold Out
33	Data Out	72	Hold Out rtn
34	Sync rtn	73	Svc Out
35	Sync	74	Svc Out rtn
36	Cmd Out rtn	75	Supr Out
37	Cmd Out	76	Supr Out rtn
38	Adr In rtn	77	Stat In
39	Adr In	78	Stat In rtn

Note: Select In is jumpered to Select Out in the terminator plug.

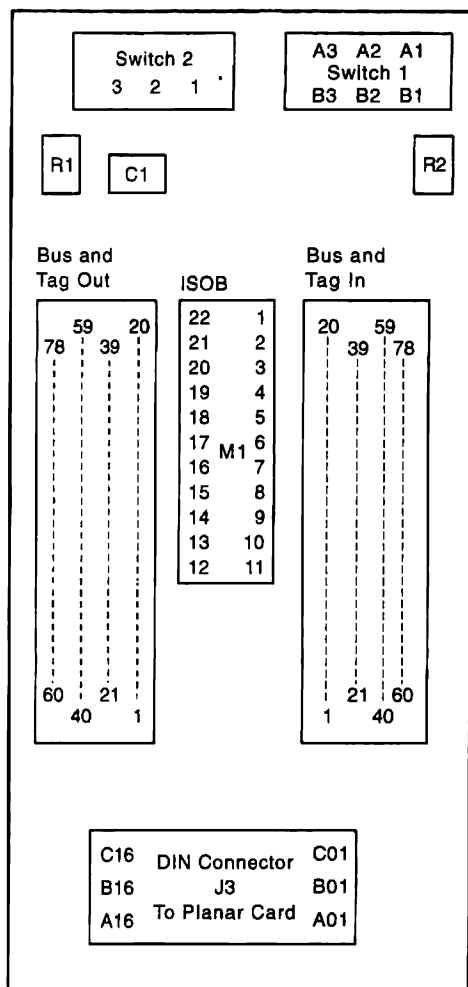


Figure 2-12. Tailgate Assembly Pin Locations Internal Channel

Table 2-12. Wrap Block Signal Distribution

From Signal Name	Pin	To Signal Name	Signal Name
Bus Out P	9	Bus In P	47
Bus Out 1	7	Bus In 1	67
Bus Out 3	27	Bus In 3	45
Bus Out 5	63	Bus In 5	3
Bus Out 7	1	Bus In 7	41
Bus Out 0	69	Bus In 0	5
Bus Out 2	49	Bus In 2	25
Bus Out 4	21	Bus In 4	23
Bus Out 6	43	Bus In 6	65
Mark 0 Out	29	Mark 0 In	61
Operational In	59	Operational Out	51
Address In	39	Address Out	75
Select In	57	Select Out	19
Suppress Out	17	Request In	13
Status In	77	Command Out	37
Service In	55	Service Out	73
Data In	15	Data Out	33
Hold Out	71	Disconnect In	53

Offline Tests

How to Run the Channel Online, Offline Switch Indicator Test (FN 02)

This test verifies that the Channel Interface switch and the offline indicator are functioning correctly.

This test should be performed at the controller because manual intervention is required for successful completion of the test.

1. Take the controller offline. See "How to Take the 3174 Model 21L Offline" on page 2-290.
2. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
3. At 4001, key in **1602**
4. Press **ENTER**; 4530 is displayed, and the offline indicator turns on.
5. Move the Channel Interface switch to Online; 4531 is displayed, and the offline indicator turns off.
6. Move the Channel Interface switch to Offline; 4530 is displayed, and the offline indicator turns on. Move the channel switch from Offline to Online as many times as necessary to verify that the Channel Interface Switch is working correctly. If the display does not change, see status code 4530 and 4531 for the repair action.
7. To make another selection, press **ENTER**; 4001 is displayed.
8. If any other status code is displayed, go to the *3174 Status Codes* manual.

How to Run Enterprise Systems Connection Adapter Tests

The Enterprise Systems Connection Wrap Test checks the data path of the Enterprise Systems Connection Adapter using the Enterprise Systems Connection (ESCON) Wrap Plug.

The Send Offline Sequence test sends continuous light from the Enterprise Systems Connection Adapter output port. It is used to measure output and intensity of the light from either the adapter or the host end of the cable. When running this test, you can disconnect the cable from either the 3174 or host end, depending on where you want to check the light.

How to Run the Enterprise Systems Connection Wrap Test (FN 01): **Warning:** To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 22L Offline" on page 2-291.

The following conditions must be met before you can perform the wrap test:

- The controller must be offline from the host system.
- The ESCON Wrap Plug must be installed.

Perform the wrap test as follows:

1. Take the controller offline.
2. Disconnect the fiber optic cable from the Enterprise Systems Connection Adapter (ESCON Adapter).
3. Clean the ESCON Wrap Plug using the fiber optic cleaning kit.
4. Install the wrap plug (P/N 5605670) on the Enterprise Systems Connection Adapter.
5. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
6. At 4001, key in **1701**.
7. Press **Enter**.

8. One of the following status codes is displayed in the status indicators:

- 2117 = Test in progress
- 2217 = Test in progress
- 2017 = Test completed
- 2917 = Test failed
- 3070 = Test failed

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

9. To continue testing, press **Enter**; 4001 is displayed.

10. To exit testing, perform the following steps.

- a. Remove the ESCON Wrap Plug.
- b. Reconnect the fiber optic cable to the adapter.
- c. Perform a normal IML.

How to Run the Send Offline Sequence Test (FN 02): The following conditions must be met before you can run the offline sequence test:

- The controller must be offline from the host system.
- The fiber optic cable must be disconnected.
- The ESCON Wrap Plug must **not** be installed.

Perform the send offline sequence test as follows:

1. Take the controller offline.
2. Disconnect the fiber optic cable from the Enterprise Systems Connection Adapter or host.
3. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
4. At 4001, key in **1702**.
5. Press **Enter** to begin the test. The test will run until you stop it or an error occurs.
6. One of the following status codes is displayed in the status indicators:
 - 2117 = Test in progress
 - 2217 = Test in progress
 - 3071 = The adapter is sending continuous light from the Enterprise Systems Connection Adapter

For all other status codes, refer to *3174 Status Codes*.

7. To exit this test, press **Enter**; 4001 is displayed.

8. To exit testing, perform the following steps:

- a. Reconnect the fiber optic cable.
- b. Perform a normal IML.

Offline Tests

How to Run Asynchronous Emulation Adapter Optional Tests

Asynchronous Emulation Adapter Port Driver/Receiver Wrap (FN 01): This function number provides an internal wrap test on individual ports of the Asynchronous Emulation Adapter card. The function parameter is used to specify the port number to be wrapped (00-07). The AEA Wrap Plug (P/N 39F6853) must be connected to the port being wrapped.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. Disconnect the external interface cable from the port to be tested and install the wrap plug (P/N 39F6853).
3. At 4001, key in **HG FN FP**
Where:
HG = 21, 22, or 23
FN = 01
FP = 0-07 (port number on AEA card)
4. For operator panel control, when keying in more than four digits, press digits, press **Advance** after each group of four until the last digit keyed is displayed.
5. Press **ENTER**;
6. One of the following codes is displayed in the status indicators where 21, 22, or 23 equals the hardware group being tested:
20HG = Test completed without error
21HG = Test in progress
22HG = Test in progress
3060 = Test failed
3061 = Test failed

For status codes 3060, 3061, and all other status codes, see the *3174 Status Codes* manual.
7. To terminate the test or to make another selection, press **ENTER**.

Note: When this test is being looped in terminal control mode, press the Enter key on the controller operator panel to stop the test.

Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring: The following pages explain and illustrate the various types of cabling used for attachment to the Asynchronous Emulation Adapter. The illustrations show the pin-to-pin assignments of the cables and wrap plug, and the use of the "null modem." Some of these cables cannot be wrapped using the offline tests and must be checked for continuity.

Note: The difference in interface cabling is due to the signaling returned by most Hayes-compatible U.S. modems. The geographic areas provided are for guidance only and may vary depending on the DCE used.

CCITT V.24/V.28 or EIA 232D Cabling to a DTE: Figures 2-13 through 2-14 show the pin assignments and cable wiring that you need to fabricate a cable that goes from the AEA connector (DTE) directly (no modem) to an ASCII display or host (DTE).

Figure 2-13 on page 2-131 shows the cable wiring when you are using a 15-pin to 25-pin adapter cable. It attaches an existing 25-pin connector on the terminal to a 15-pin connector on AEA card.

Figure 2-13 on page 2-131 shows this cable wiring for U.S.A./Canada.

Figure 2-14 on page 2-132 shows this cable wiring only for Europe, Americas, Far East.

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

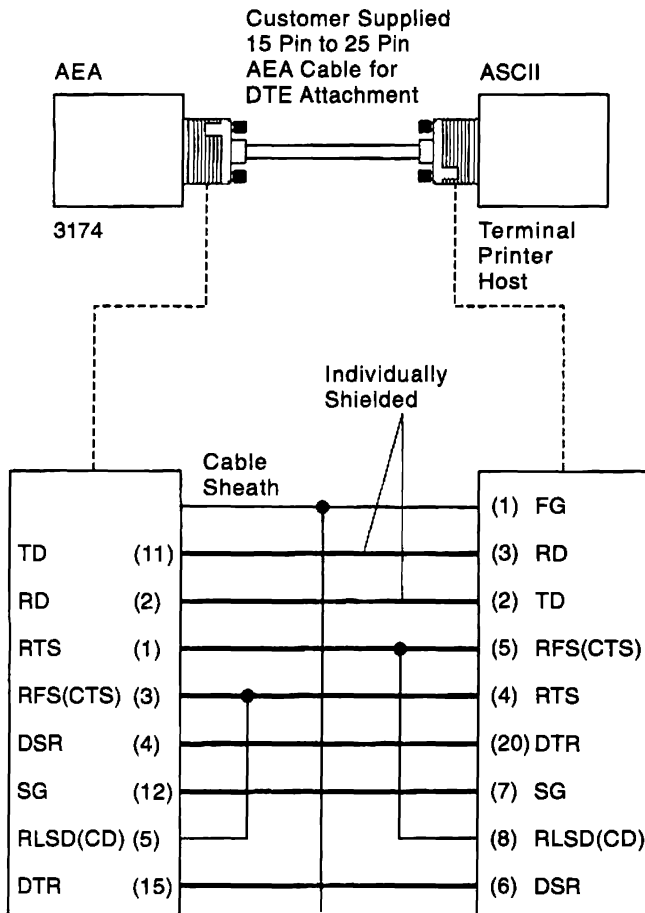


Figure 2-13. EIA 232D External Interface Cabling to a DTE (U.S.A./Canada)

Offline Tests

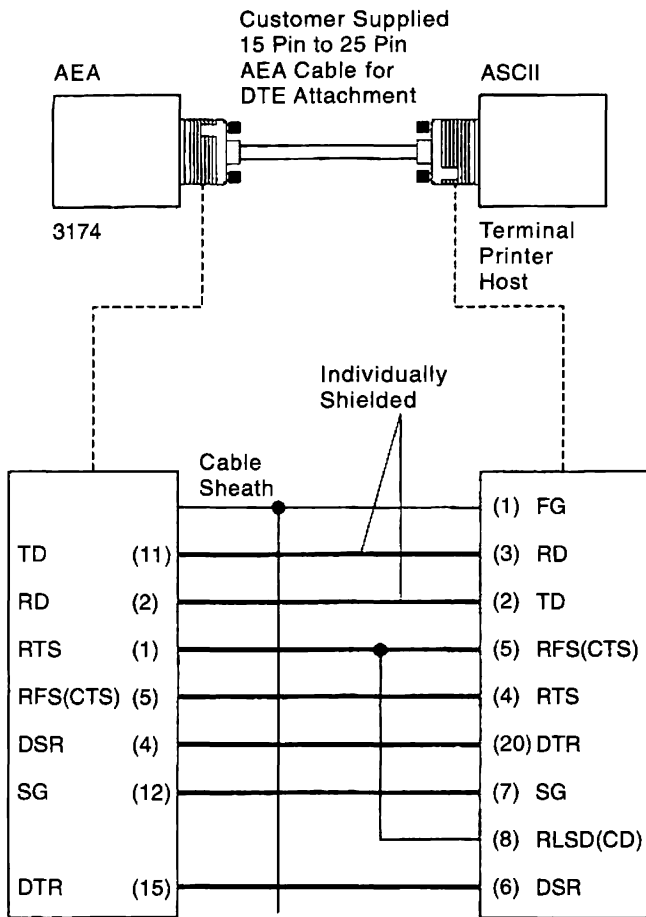


Figure 2-14. EIA 232D External Interface Cabling to a DTE World Trade (Europe, Americas, Far East)

You can order this adapter cable from IBM. See Chapter 6 of this manual for the part number. Figure 2-15 shows the cable wiring using the IBM-supplied 15-pin to 25-pin adapter cable for the U.S.A./Canada.

Figure 2-16 on page 2-134 shows this cable wiring for Europe, Americas, Far East.

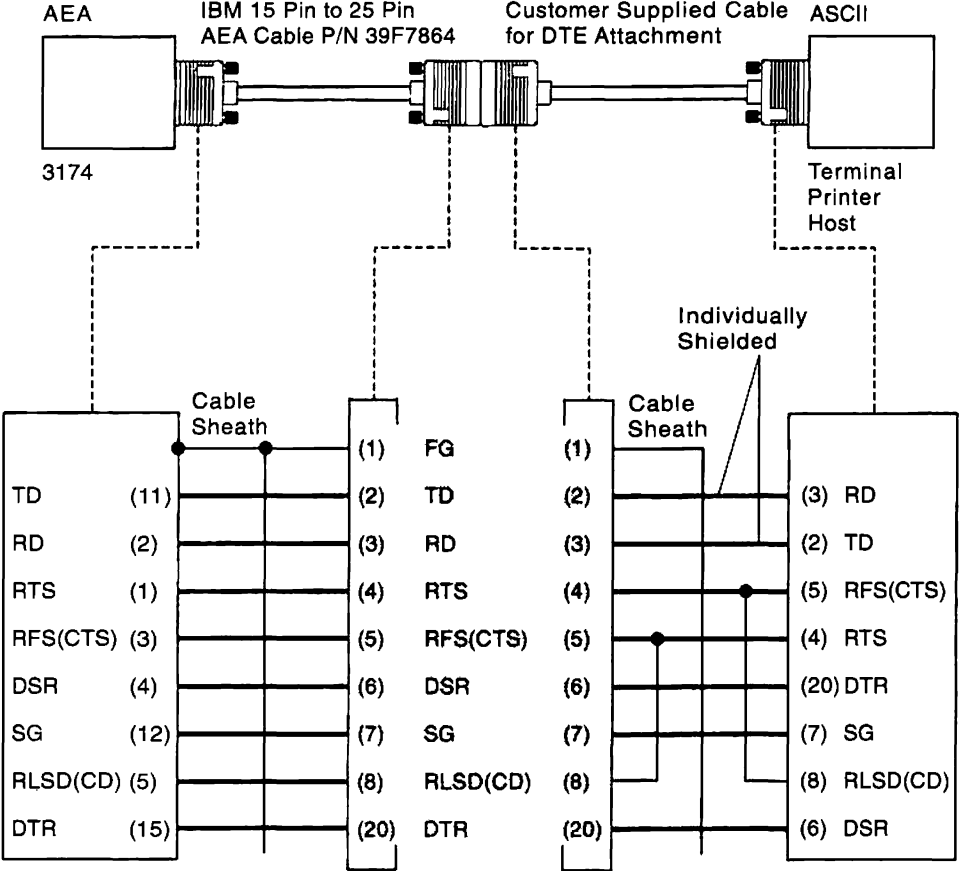


Figure 2-15. EIA 232D IBM-Supplied Cabling to a DTE (U.S.A./Canada)

Offline Tests

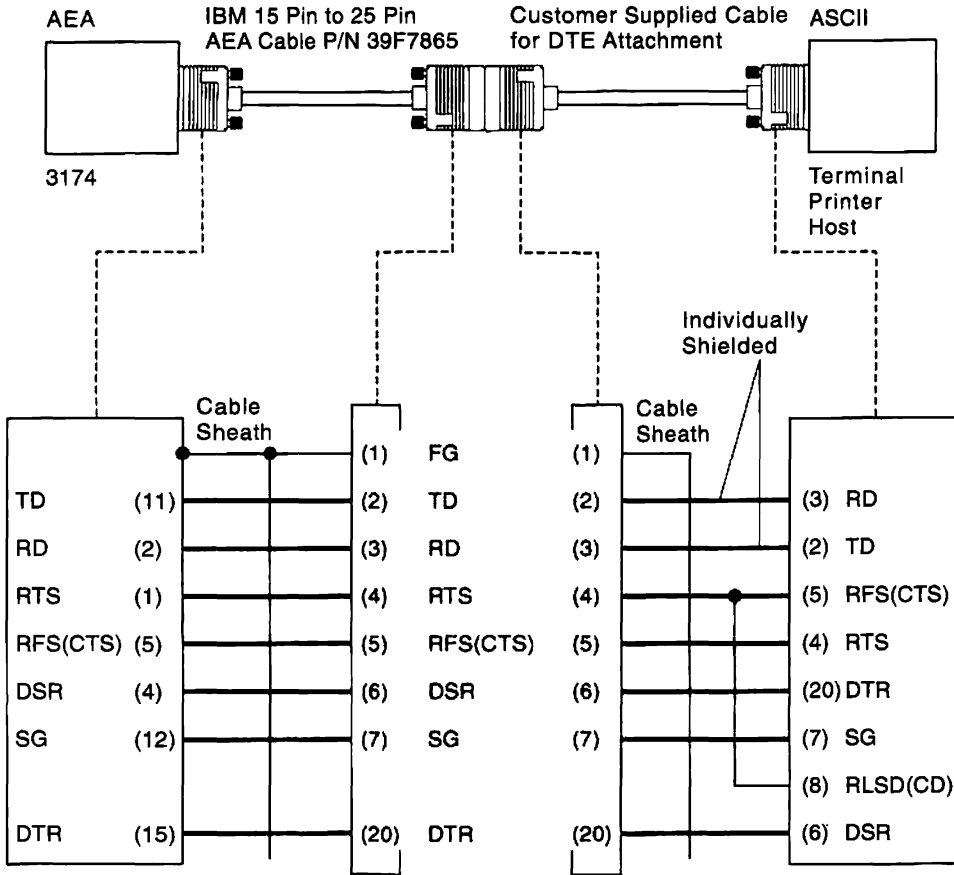


Figure 2-16. EIA 232D IBM-Supplied to a DTE (Europe, Americas, Far East)

CCITT V.24/V.28 or EIA 232D Cabling to a DCE: Figures 2-17 through 2-18 show the pin assignments and cable wiring to fabricate a cable that goes from the AEA connector to a modem.

Figure 2-17 shows the cable wiring when you are using a three-meter (10 foot) 15-pin to 25-pin adapter cable for U.S.A./Canada).

Figure 2-18 on page 2-136 shows this cable wiring for Europe, Americas, Far East).

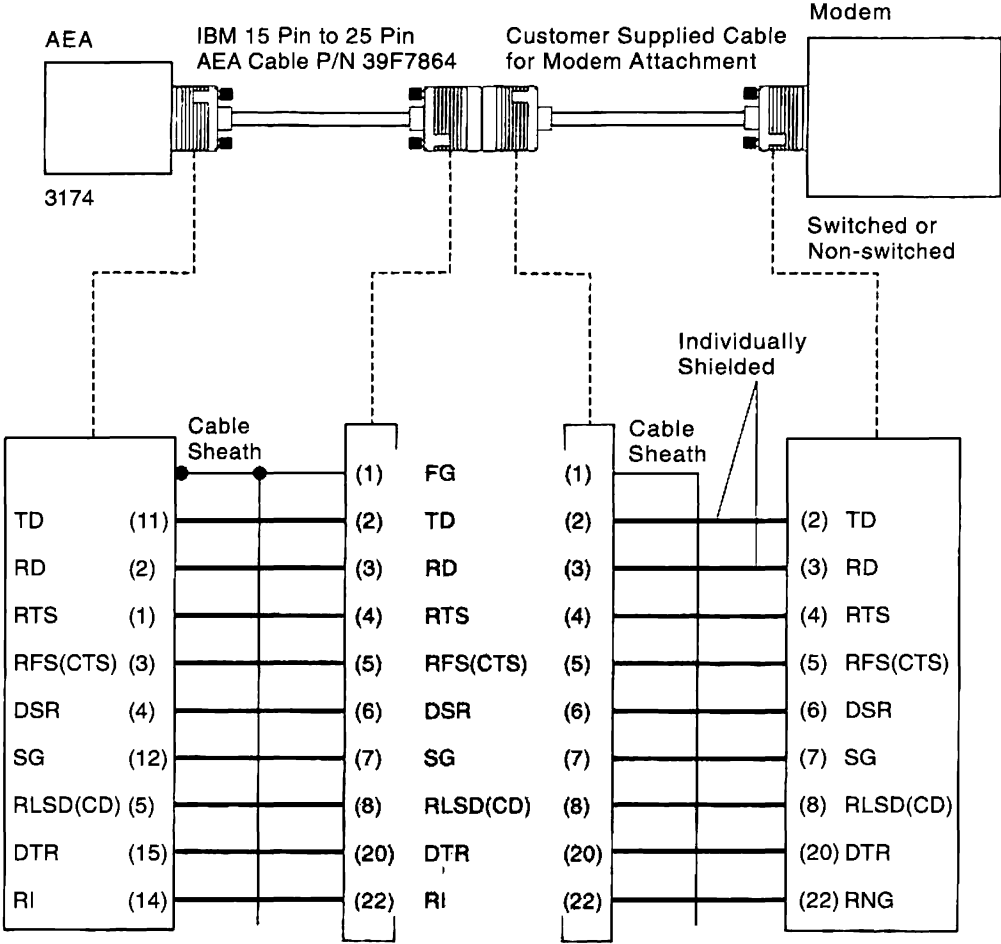


Figure 2-17. EIA 232D External Interface Cabling to a DCE (U.S.A./Canada)

Offline Tests

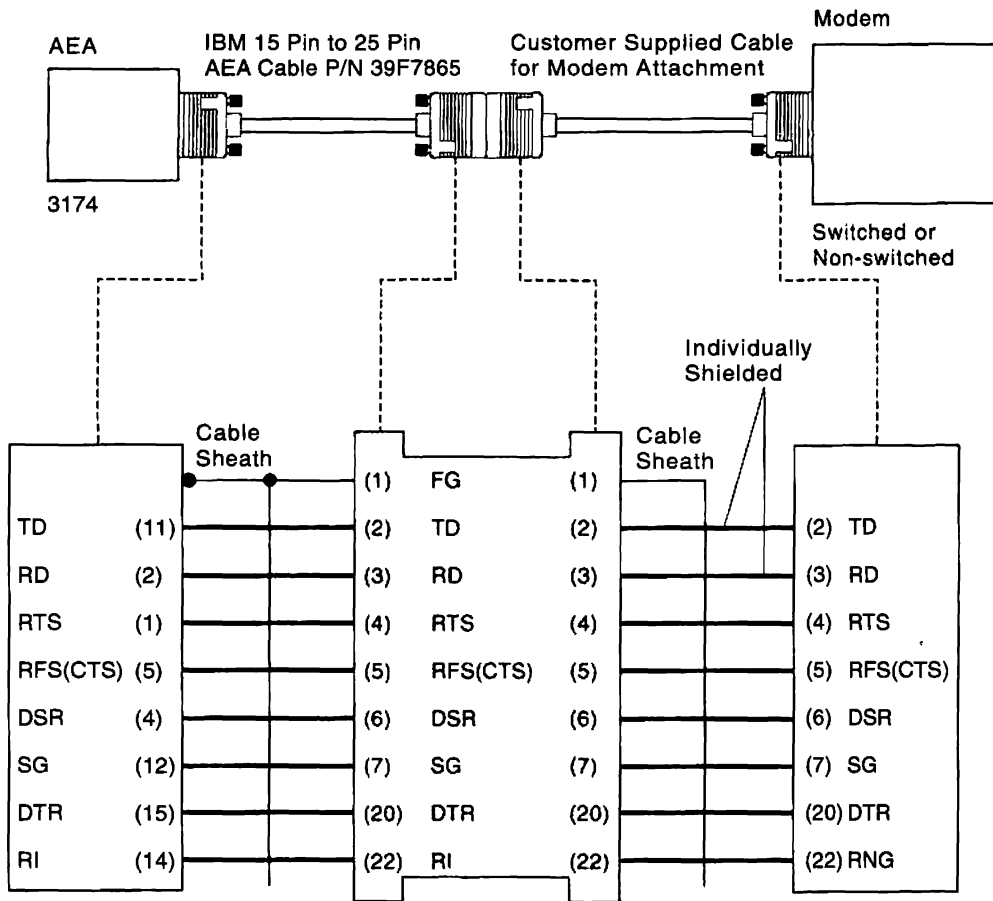


Figure 2-18. EIA 232D External Interface Cabling to a DCE (Europe, Americas, Far East)

Creating a Null Modem: A null modem is an adapter that allows you to connect a 3174 to a device without having to use a modem. Although null modems are commercially available, most do not contain the correct wiring pattern. The correct null modem wiring pattern is shown in figures 2-19 through 2-20.

Figure 2-19 shows the null modem wiring pattern when you are using a three-meter (10 foot) 25-pin to 15-pin adapter cable for U.S.A./Canada. Figure 2-20 on page 2-138 shows this wiring pattern for Europe, Americas, and Far East.

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

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

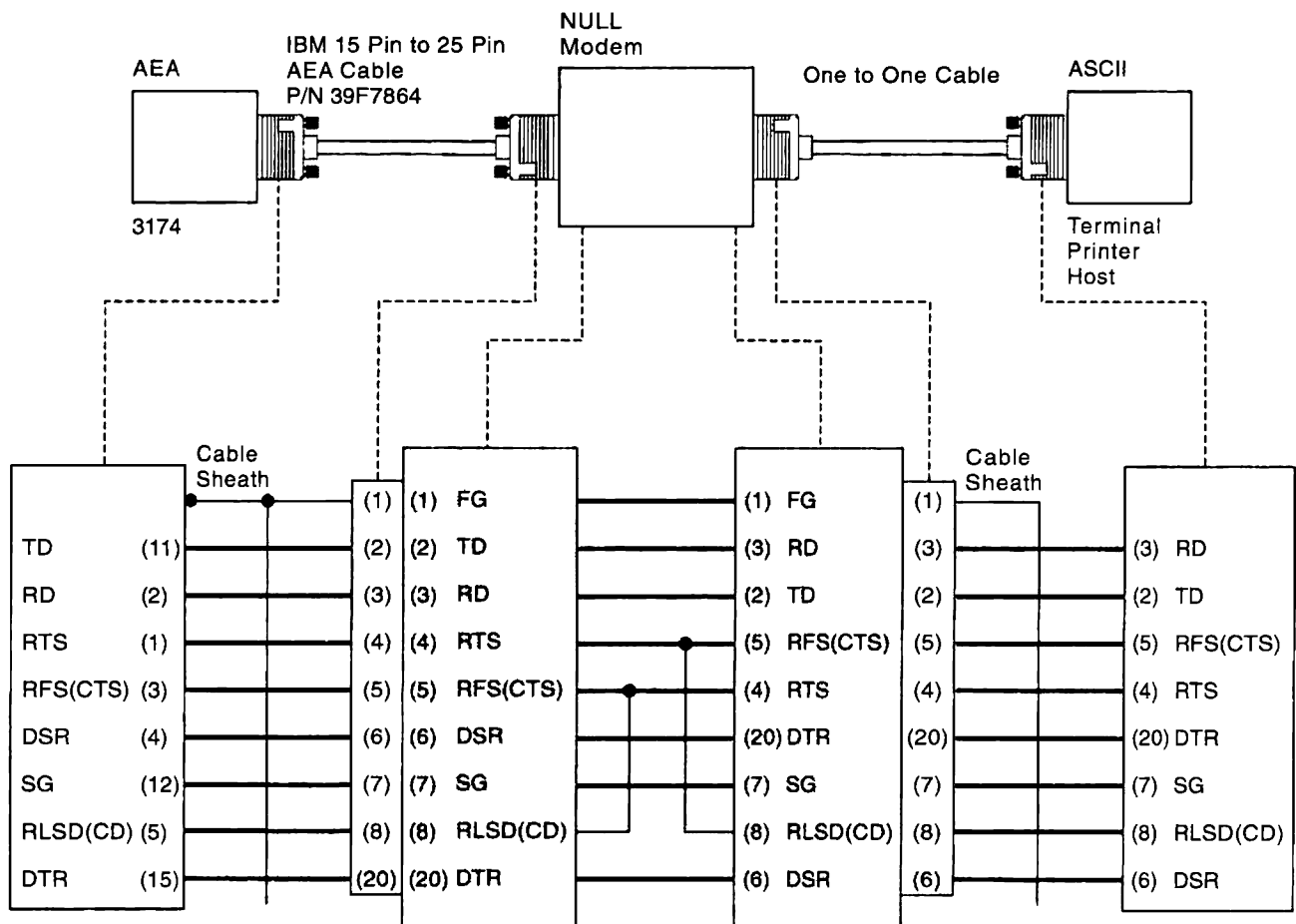


Figure 2-19. Null Modem Wiring (U.S.A./Canada)

Offline Tests

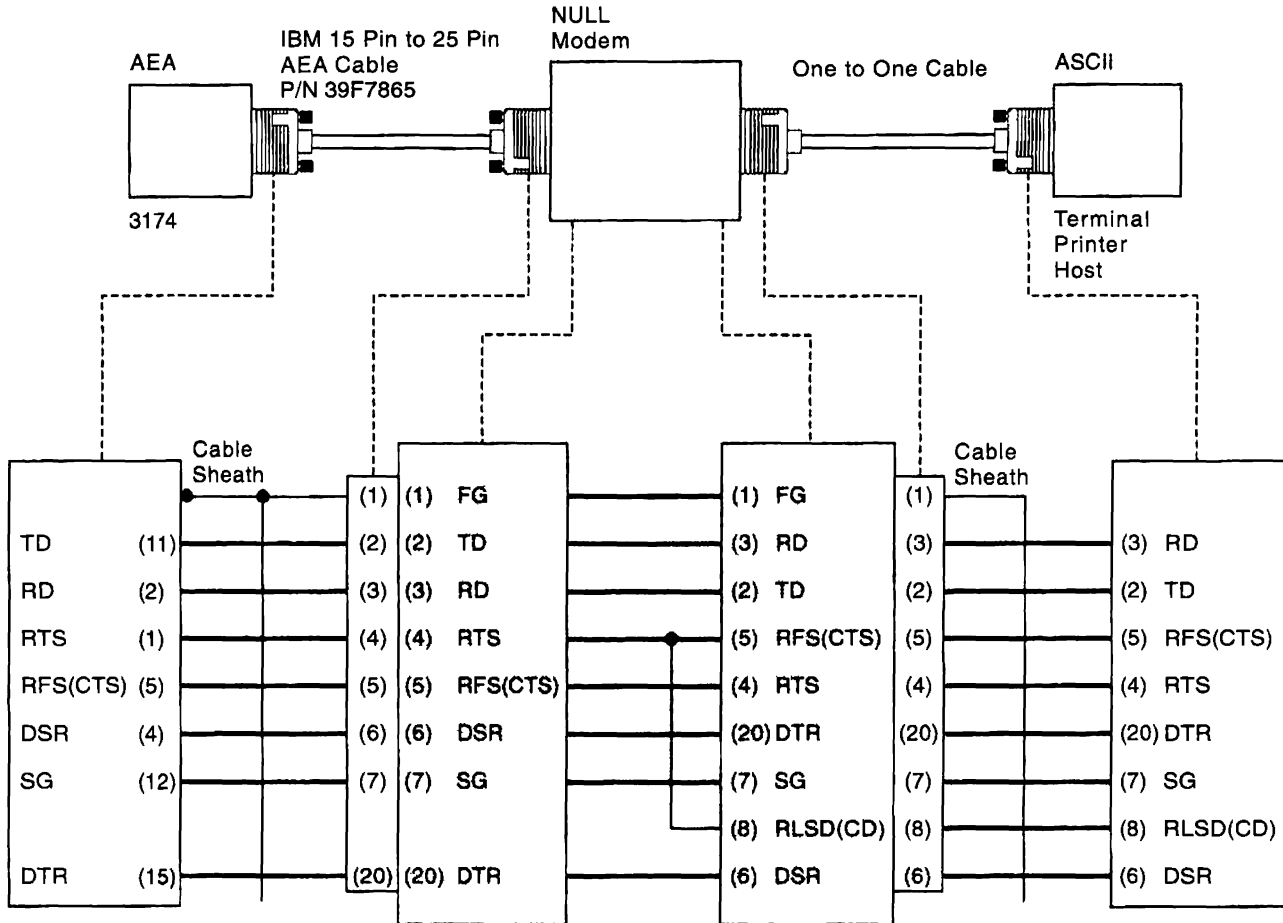


Figure 2-20. Null Modem Wiring (Europe, Americas, Far East)

How to Run Terminal Adapter/TMA/FTA/3299 Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. Select a function number (FN) and function parameter (FP).
Note: Table 2-13 on page 2-140 and the paragraphs following Table 2-13 on page 2-140 describe the purpose of each function number/function parameter and any conditions that have to be met before a particular function number/function parameter can be used.
3. At 4001, key in **HG FN FP**
Where:
HG = 26 or 27
FN = Function number
FP = Function parameter.
4. For operator panel control, when keying in more than four Advance after each group of four until the last digit keyed is displayed.
5. Press **ENTER**; the test begins.
6. One of the following codes is displayed in the status indicators, where 26 or 27 equals the hardware group being tested:
21HG = Test in progress
22HG = Test in progress
20HG = Test completed
29HG = Test failed
304x = Test failed
4550 = Test completed.

For status codes 29HG, 304x, 4050, and all other status codes, see *3174 Status Codes*.
7. To terminate the test or to make another selection, press **ENTER**. 4001 is displayed.
Note: When these tests are being looped in terminal control mode, press the ENTER key on the controller operator panel to stop the test.

Offline Tests

Table 2-13. Function Numbers and Function Parameters (Port Wrap)

FN	Description	FP	Description	Condition for test
01	Terminal Adapter Port Wrap	HG 26 00, 08, 16, 24 ¹ HG 27 00	Terminal Adapter Port 00, 08, 16, 24	Disconnect the Terminal Adapter port signal cable.
02	Multiplexer Port Wrap	00-31	Logical Port 00-31	Disconnect the terminal cable from the multiplexer port.
03	Terminal Path Test	00-31	Logical Port 00-31	Terminal attached and power is switched on.
04	CUT Display Exerciser	00-31	Logical Port 00-31	<ul style="list-style-type: none"> Terminal attached and power is switched on. The terminal must be a 3278 or equivalent.
05	Terminal Adapter Wrap All			Disconnect port 00, 08, 16, and 24 signal cables.
06	Multiplexer Wrap All	HG 26 00, 08, 16, 24 ¹ HG 27 00	Terminal Adapter port number	Disconnect the terminal signal cables from the multiplexer.
07	Printer Exerciser Test	00-31	Logical Port 00-31	Printer attached, power is switched on and ready.

¹Port 24 on HG 26 is present only on the base planar board. It is not present if you have the 3270 Port Expansion Feature.

Terminal Adapter Function Number Descriptions: The following paragraphs describe the port wrap function numbers. Figure 2-21 illustrates the physical ports and devices in which the tests execute when a given function number is selected.

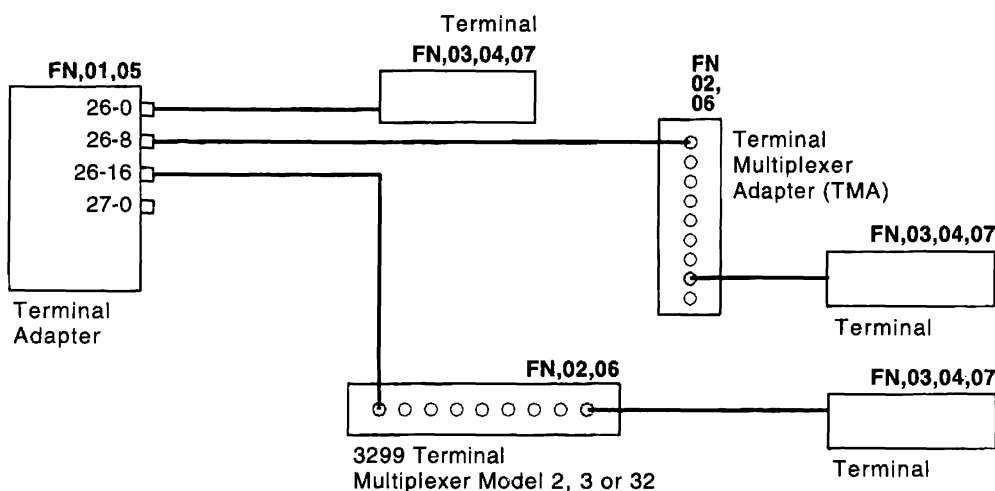


Figure 2-21. Block Diagram of Terminal Adapter Terminal Attachment

Terminal Adapter Port Wrap (FN 01): This function number provides an internal wrap test on individual ports on the Terminal Adapter. The function parameter is used to specify the port number to be wrapped. Status code 2026 or 2027 indicates successful test completion. Status code 3040 indicates the test failed.

Multiplexer Port Wrap (FN 02): This function number provides an internal wrap of the output ports on a TMA card or a 3299 Terminal Multiplexer Model 2, 3, or 32. The function parameter is used to specify the logical port number to be wrapped. This number is obtained by adding the Terminal Adapter port number to which the multiplexer is connected to the multiplexer port number.

Example:

To wrap port 2 on the TMA card that is connected to port 16 on the Terminal Adapter, enter **18** as the function parameter.

Status code 2026 or 2027 indicates successful test completion. Status code 3040 indicates the test failed.

Note: Wrap Test (FN 02 and 06) cannot be performed on a 3299 Terminal Multiplexer Model 1.

Terminal Path Test (FN 03): This function number provides a path test on any supported terminals or printers that are directly attached to the Terminal Adapter or attached through a multiplexer. The path to the terminal is automatically determined by the diagnostic. The function parameter is used to specify the logical port number of the terminal to be tested. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. Status code 4550 indicates successful test completion. Status code 3041 indicates the test failed.

CUT Display Exerciser (FN 04): This function number provides a data test to terminals that are directly attached or attached through a multiplexer. The physical path to the terminal is automatically determined by the test. The function parameter is used to specify the logical port number of the terminal to be tested. A data pattern appears on the 3278 or similar terminal when this test is performed. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. This test is restricted to 3278s or equivalent terminals. Status code 4550 indicates successful test completion. Status codes 3041 and 3042 indicate that the test failed.

Terminal Adapter Wrap All (FN 05): This function number provides an internal wrap of the port on the Terminal Adapter. A function parameter is not required for this function number. Status code 2026 or 2027 indicates successful test completion. Status code 3040 indicates that the test failed.

Multiplexer Wrap All (FN 06): This function number provides an internal wrap of the output ports on a TMA card or a 3299 Model 2, 3, or 32. The function parameter is used to specify the port number on the Terminal Adapter to which the multiplexer is attached.

Notes:

1. Wrap tests (FN 02 and 06) cannot be performed on 3299 Terminal Multiplexer Model 1.
2. Status code 2026 or 2027 indicates successful test completion. Status code 3040 indicates the test failed.
3. Function numbers 05 and 06 run on the Terminal Adapter and terminal multiplexer adapters when the customer setup (HG81) test is performed.

Printer Exerciser Test (FN 07) This function number provides a data test to printers that are directly attached or attached through a multiplexer. The path to the printer is automatically determined by the test. The function parameter is used to specify the logical port number of the printer to be tested. A single line of data prints on the printer being tested. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. This test is restricted to IBM 3262, 3268, 3287, 3289, 4214, 4224, 4234, 4245, 5210, or equivalent printers. Status code 4550 indicates successful test completion. Status code 3041 and 3042 indicate the test failed.

How to Run Token-Ring Adapter Optional Tests

Warning: Do not run the adapter wrap (FN 02) with the token-ring Adapter cable attached to the controller and the ring. If the cable is attached to the ring, token-ring problems occur.

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.
2. Select a function number.

Note: Table 2-14 and the paragraphs following "Token-Ring Adapter Function Numbers" on page 2-143 describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.

3. At 4001, key in **HG FN**

Where:

HG = 31

FN = Function number

4. Press **ENTER**; the test begins.
5. One of the following codes is displayed in the status indicators:

2131 = Test in progress

2231 = Test in progress

2031 = Test completed

2931 = Test failed

For status code 2931 and all other status codes, see the *3174 Status Codes* manual.

6. To make another selection at 20HG or 29HG, press **ENTER**.

Table 2-14. Token-Ring Adapter Function Numbers

FN	Description	Condition
01	Cable wrap test	The token-ring adapter cable is connected or wrap plug P/N 6165899 is installed. Note: The token-ring adapter cable must be connected to the controller. The other end of the cable can either be connected or disconnected from the token ring.
02	Adapter wrap test	Wrap plug P/N 6165899 is installed. Token-ring adapter cable is disconnected from the ring.
10	Display universal address	Note: The universal address is displayed in the following format: 4535 XXXX XXXX XXXX where, XXXX XXXX XXXX is the universal address.

Token-Ring Adapter Function Numbers: Three optional tests can be performed on the token-ring adapter.

Cable Wrap (FN 01): This test wraps frames through the self-shorting token-ring adapter cable or through the wrap plug. The test simulates the operations that take place when the adapter is connected to the ring. See Figure 2-22 on page 2-144. Before selecting this test, either connect the token-ring adapter cable to the adapter, or install a wrap plug (P/N 6165899).

Notes:

1. If the token-ring adapter cable is attached to the IBM Cabling System, the frames wrap to the 8228 multistation access unit and back to the controller. This can be used as a problem isolation technique. If the wrap test passes with the cable disconnected from the Cabling System, but fails with the cable connected to the cabling system, the problem is not in the controller or the token-ring adapter cable.
2. This test runs automatically when Test 81 (CSU) is performed.

Adapter Wrap (FN 02): This test wraps frames at the I/O connector of the token-ring adapter. Before running this test, install a wrap plug (P/N 6165899). Although this test is similar to function number 01, it checks different circuitry on the token-ring adapter.

Display Universal Address (FN 10): This function number is used to display the universally administered address contained on the token-ring adapter. This address is 12 digits long and is assigned to each token-ring adapter card manufactured by IBM. For the proper display of this address, this function number should only be requested when the tests are being controlled from the terminal connected to port 0 on HG 26. When this function number is selected, the following status code is displayed: 4535 XXXX XXXX XXXX where, XXXX XXXX XXXX is the universally administered address

Token-Ring Adapter Replacement Considerations: If the 3174 fails to communicate with the token-ring after replacing the token-ring adapter, addressing problems can be the cause of the failure. Each token-ring adapter is shipped with a unique universally administered address encoded on it. You can elect to use the universally administered address or your own locally administered addresses. The locally administered address replaces the universally administered address that is already encoded on the token-ring adapter card. It is recommended that the customer use locally administered addresses. You select a locally administered address during customizing. Use the following procedure to determine which kind of addresses you are using:

1. Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-41.
2. Go to any 3278 or equivalent terminal connected to the 3174.
3. Press and hold ALT, press TEST.
4. Key in /2,2
5. Check the token-ring adapter address:

For Gateway controllers: Check question 900.

For non-Gateway Controllers: Check question 106.

6. If the first 2 bits of byte 0 contain 01, you are using locally administered addresses.

Note: If you are using locally administered addresses, then addressing is not the cause of the failure unless some other device on the ring is already using the same address.

7. If the first 2 bits of byte 0 contain 00, you are using universally administered addresses. In this case, the following action must be taken:

For Gateway controllers:

Offline Tests

- a. Reconfigure the 3174. Enter the new universal address of the replacement token-ring adapter in question 900 (configuration C3.0 and prior) or question 80 (configuration C4.0 and up).
- b. Reconfigure the Downstream Physical Units (workstations and controllers) associated with this Gateway. Change the required customization that identifies the address of the Gateway for each DSPU. On 3174s that are DSPUs this is specified in question number 107.

For non-Gateway controllers:

Reconfigure the 3174. Enter the new universal address of the replacement token-ring adapter in question 106 (configuration C3.0 and prior) or in question 80 (configuration C4.0 and up).

8. To obtain the universal address of the replacement token-ring adapter card, see "How to Run Token-Ring Adapter Optional Tests" on page 2-142.

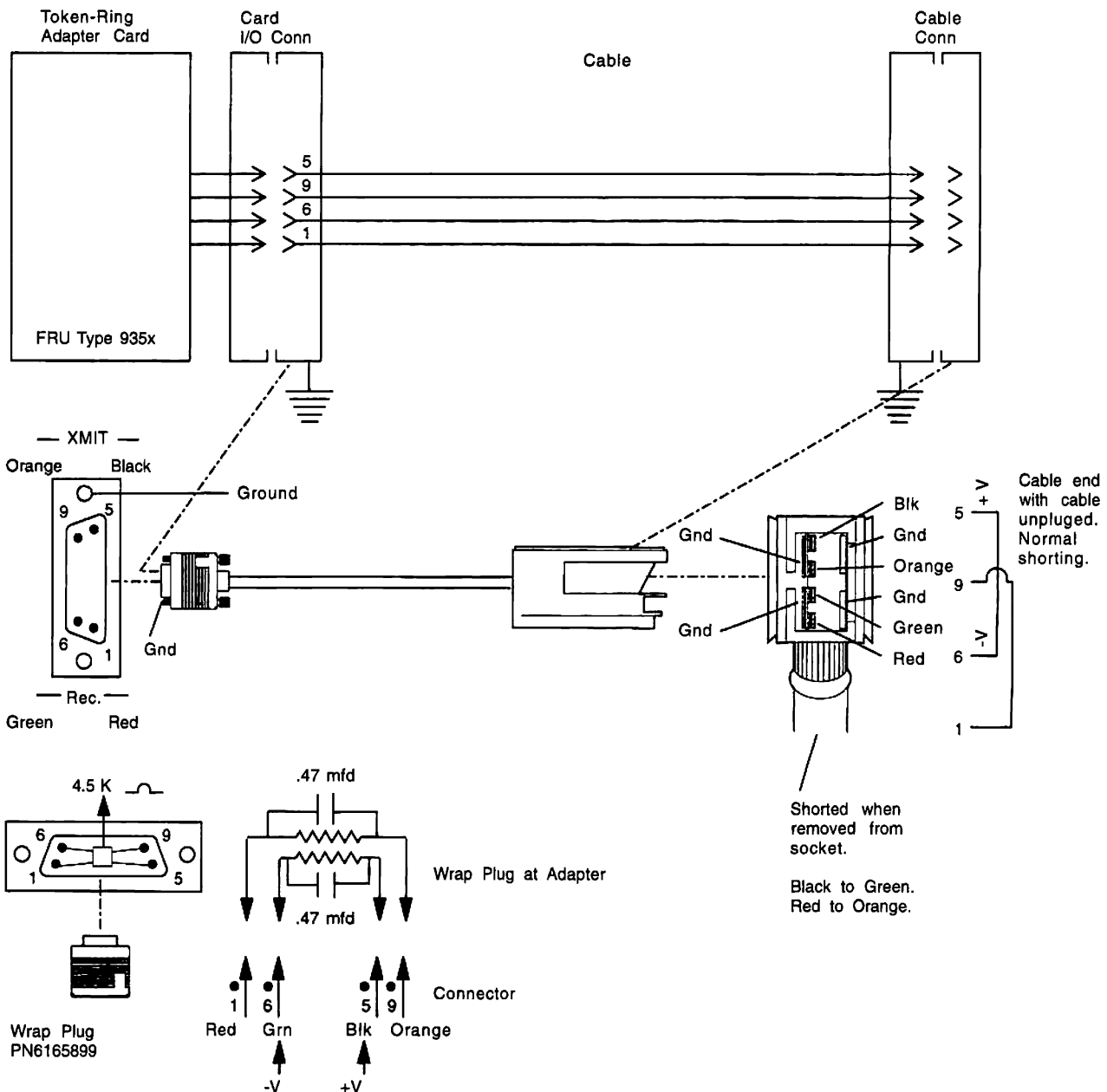


Figure 2-22. Token-Ring Adapter Line Flow (Cable and Wrap Plug)

How to Run ISDN Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-102.

Note: Table 2-15 and the paragraphs that follow describe the purpose of each function number and function parameter, and the conditions that must be met before a particular function number can be used.

2. At 4001, key in **HGFN**

Where:

HG = 36, 37, 38, or 39

FN = Function Number.

3. Press **Advance**.

4. Key in **FP**

Where:

FP = Function Parameter.

5. Press **Enter**; the test begins.

6. One of the following codes is displayed in the status indicators where HG equals the hardware group being tested.

21HG = Test in progress

22HG = Test in progress

20HG = Test complete successfully

29HG = Test complete with error

7. For status code 29HG and all others, see 3174 *Status Codes* for the recovery action.

8. To continue testing, press **Enter**; 4001 is displayed.

Table 2-15. ISDN Adapter Function Numbers and Function Parameters

FN	Description	FP	Condition
01	Test All Ports		
02	Test Specified Ports	01, 02	Select FN 01 to test ports 0 and 1 or FN 02 to test ports 2 and 3.
03	ISDN Adapter/Cable Wrap Test	00, 01, 02, 03	<p>Cable Wrap: Disconnect the cable from the ISDN Network Terminator (NT1). Insert the ISDN wrap plug into the coupler, and insert the ISDN cable into the other end of the wrap coupler.</p> <p>Port Wrap: Disconnect the ISDN cable from the desired ISDN Adapter port. Insert the ISDN wrap plug (without the coupler) into the ISDN Adapter port.</p>

Test All Ports (FN 01): Runs a basic adapter test to check all of the ports on the ISDN Adapter (PN=0, 1, 2, 3).

Test Specified Ports (FN 02): Run tests on ports 0 and 1 or ports 2 and 3, as specified by the Function Parameter. Select FP 01 to test ports 0 and 1 or FP 02 to test ports 2 and 3.

ISDN Adapter/Cable Wrap Test (FN 03): Runs a test to check the ISDN Adapter ports or the ISDN cable. To run a wrap test on the cable, use the ISDN wrap plug and coupler (P/N 74F4409). To wrap an ISDN Adapter port, use the wrap plug only. Select FP 00, 01, 02, or 03 to specify the number of the port you wish to wrap.

Offline Tests

Figure 2-23 on page 2-146 illustrates the wrap plug and cable configuration you would set up to run a wrap test on the ISDN cable. Figure 2-24 on page 2-146 illustrates the removal of the wrap plug from the wrap coupler. At this point you would then insert the wrap plug into the desired ISDN Adapter port.

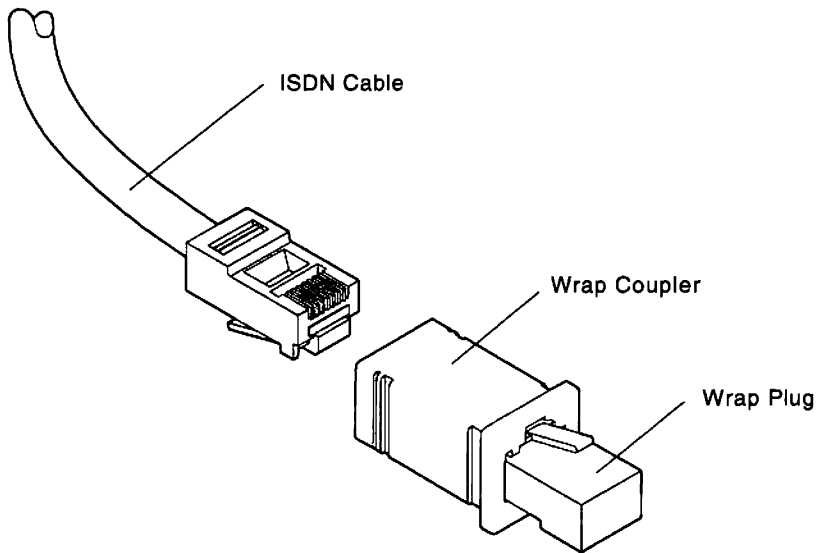


Figure 2-23. Running a Wrap Test on the ISDN Cable

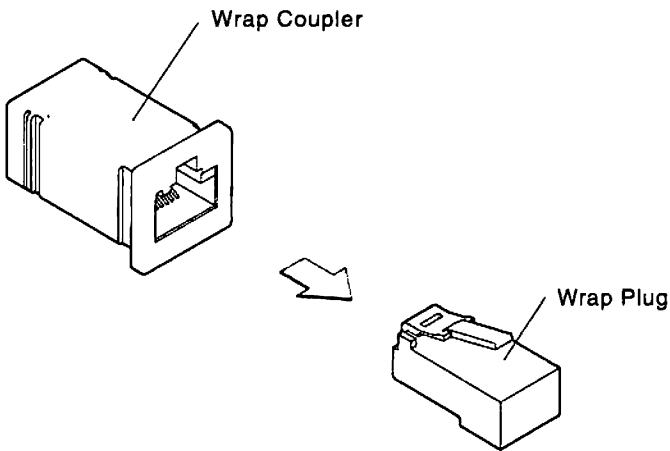


Figure 2-24. Removing the Wrap Plug from the Wrap Coupler

ISDN Wrap Plug and Cable Wiring: Figure 2-25 shows the wiring of the ISDN cable on both the cable and adapter ends. Figure 2-26 on page 2-148 shows the pin assignments of the ISDN wrap plug.

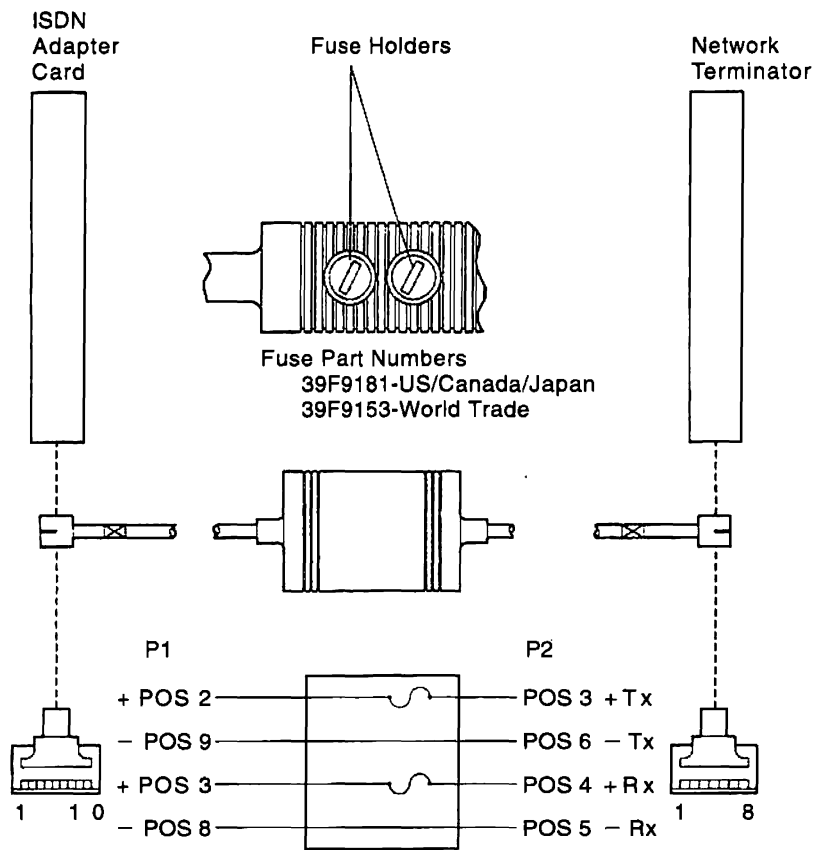


Figure 2-25. ISDN Adapter Cable Wiring (U.S., Canada, and Japan)

You can replace the fuses in the fuse holders on the ISDN cable. To remove the fuse, press down on the fuse holder with your thumb or a screwdriver, and turn it *counterclockwise*. This releases the fuse holders and enables you to replace the individual fuses. The part number for fuses used in the United States, Japan, and Canada is 39F9181. The part number for fuses used in World Trade countries is 39F9153.

Offline Tests

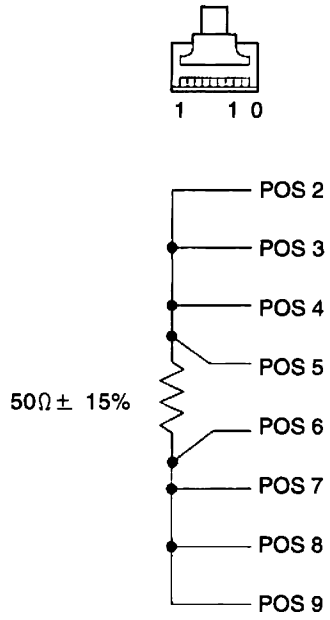


Figure 2-26. ISDN Adapter Wrap Plug Wiring (U.S., Canada, and Japan)

How to Run Ethernet Adapter Optional Tests

Warning: Install all the Ethernet adapter wrap plugs and disconnect the 3174 from the Ethernet Network before you run the Adapter Wrap All (FN 01) and Adapter Wrap Individual (FN 02) tests.

1. Load the test monitor. For information about loading the test monitor, see “How to Load the Test Monitor” on page 2-102.
2. Select a function number.

Note: Table 2-16 describes the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.

3. At 4001, key in **HG FN FP**

where:

HG = 41

FN = Function number

FP = Function Parameter (Ethernet cable type). Used with FN = 02 only.

01 = 10BASE5

02 = 10BASE2

03 = 10BASE-T

4. Press **Enter**; the test begins.
5. One of the following codes is displayed in the status indicators:

2141 = Test in progress

2241 = Test in progress

2041 = Test completed

2941 = Test failed

For an explanation of status code 2941, refer to *3174 Status Codes*.

6. To make another selection at 20HG or 29HG, press **Enter**.

Table 2-16. Ethernet Adapter Optional Test Function Numbers

FN	Description	Condition
01	Adapter wrap all test	The Ethernet adapter cable is disconnected from the adapter and the Ethernet Network, and all wrap plugs are installed on the appropriate connectors.
02	Adapter wrap individual test	The Ethernet adapter cable is disconnected from the adapter and the Ethernet Network, and the appropriate wrap plug is installed on the appropriate connector. This test requires the FP for the Ethernet cable type.
10	Display universal address	Note: The universal address is displayed in the following format: 3082 XXXX XXXX XXXX where, XXXX XXXX XXXX is the universal address. The address is displayed in non-canonical format. For more information, see the <i>3174 Planning Guide</i> .

Offline Tests

Ethernet Adapter Replacement Considerations: If the 3174 fails to communicate with the Ethernet Network after the Ethernet adapter has been replaced, the problem can be caused by addressing problems, such as two network devices using the same address.

Each Ethernet adapter is shipped with a universally administered address encoded on it. You can elect to use this address or your own locally administered address. If you use a locally administered address, it replaces the universally administered address encoded on the Ethernet adapter. It is recommended that you use locally administered addresses.

Use the following procedure to determine which kind of addresses are being used:

1. Perform a normal IML. For information about performing a normal IML, see "Normal Initial Microcode Load (IML)" on page 1-41.

2. Go to any 3278, or equivalent, workstation that is locally attached to the 3174.

3. Hold **ALT** and press **TEST**.

4. Key in **/2,2**.

5. Check the Ethernet adapter address (customization question 084).

6. If the first 2 bits of byte 0 contain 01, locally administered addresses are being used.

Note: If locally administered addresses are used, addressing problems cannot cause failure unless another network device is using the same address.

7. If the first 2 bits of byte 0 contain 00, universally administered addresses are being used. If universally administered addresses are used, perform the following action:

a. Reconfigure the 3174. Enter the new universal address of the replacement Ethernet adapter in customization question 84.

b. If the controller is a gateway, reconfigure the DSPUs (workstations and controllers) associated with this gateway. For each DSPU, change the required customization that identifies the address of the gateway. For 3174 DSPUs, this is specified in customization question 107.

8. To obtain the universal address of the replacement Ethernet adapter, run the Display Universal Address (FN 10) optional test. For information about running the Display Universal Address (FN 10) optional test, return to "How to Run Ethernet Adapter Optional Tests" on page 2-149.

How to Display the Test Log

This test is used to display the test log that is created when errors occur during hardware group tests. The test log can 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 because the Test Log is reset.

1. Select a function number.

Note: Table 2-17 on page 2-151 and the paragraphs following "Test Log Function Number Descriptions" on page 2-151 describe the purpose of each function number.

2. Key in **80**

Where:

80 = Load test monitor

3. Key in **01** or **06**

4. Press **ENTER**

5. To make another selection at 20HG, press **Enter**.

Table 2-17. Test Log Function Numbers

FN	Description
01	Display Test Log
06	Display Test Log Count/Time

Test Log Function Number Descriptions: The following paragraphs describe the function numbers that are used to display the test log and the test log count/time.

Note: If the test log does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the test log.

Display Test Log (FN 01): When function number 01 is selected in terminal control mode, the test log (shown in Figure 2-27) that is contained in storage is displayed. This log is created when errors occur during hardware group tests. This function number is always used to display the test error log. If this function number is selected in operator panel control mode, the status codes are displayed. The other information such as pass count and elapsed time are not displayed.

Display Test Log Count/Time (FN 06): Function number 06 is used to display the test log pass count (PCNT) and elapsed time (HHMMSS) when running tests from the operator panel (When FN 01 is run, the status codes only are displayed in operator panel control).

Status code 4580 PCNT PCNT 00HH MMSS is displayed if no errors are recorded in the test log. Status code 4581 PCNT PCNT 00HH MMSS is displayed if errors are recorded in the test log.

```

          Test Log          PANEL 1 OF 1
TOTAL PASS COUNT 5      START TIME 15:26:57      ELAPSED TIME 01:40:03

PASS  ELAPSED TIME  STATUS CODES
 1    00:00:02      3024 0102 9110 02   9120 21
 1    00:01:12      3002 0216 9210 11   9500 18
 2    00:02:35      3024 0102 9110 02   9120 21
 2    00:03:47      3002 0216 9210 11   9500 18
 3    00:05:03      3024 0102 9112 02   9120 21
 3    00:06:15      3002 0216 9210 11   9500 18
 4    01:20:06      2987 9051 20
 5    01:22:36      2987 9051 20

PF: 3=Quit 8=Fwd
    
```

Figure 2-27. Test Log

Note: The start time and elapsed time are in hours, minutes, and seconds. The elapsed time is the time during which the test runs until a failure occurs or until the test run is completed.

Offline Tests

How to Display the Test Monitor Functions (Terminal Control)

1. Load the test monitor. Select terminal control. See "How to Load the Test Monitor" on page 2-102.
2. Go to the terminal connected to port 0 on HG 26. The test menu is displayed and 4001 is displayed under the select line.

Note: Table 2-18 and the paragraphs following "Test Monitor Function Number Descriptions" describe the purpose of each function number.

3. Select a function number.
4. At 4001, key in **80FN**
Where:
80 = Load test monitor
FN = Function number
5. Press **ENTER**.
6. To make another selection at 2080, press **ENTER**.

Table 2-18. 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

¹Function number 03 erases the test log contained on the Utility disk.

Test Monitor Function Number Descriptions: The following paragraphs describe the purpose of the test monitor function numbers.

Display Test Log – IML Drive (FN 02): The test log (shown in Figure 2-27 on page 2-151) is displayed from the IML drive. This function number is valid only when a Test All diagnostic, such as HG 81, 82, or 87, is looping and is used only when the test log is not available. See "How to Display the Test Log" on page 2-150.

Note: If the test log on the IML drive (disk/diskette) does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the test log.

Reset Test Log – IML Drive (FN 03): 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): The Hardware Configuration Table, shown in Figure 2-28 on page 2-153, is displayed and must be selected when the diagnostics are controlled from the terminal. This panel shows all the hardware installed in the controller that generated a valid FRU ID number during an IML. The SC column in the table contains a 32XX number only if a problem has occurred with an FRU during the IML. See the *3174 Status Codes* manual to determine what a particular status code means. This panel shows the configuration for a Model 21L. On your machine, only those FRUs that are physically installed are displayed in this table.

```

_____ Hardware Configuration Table _____
HG TYPE LC DESCRIPTION          SC      HG TYPE LC DESCRIPTION          SC
01 9630 03 File Adpt
01 9361 01 Diskette 1 - 2.4MB
03 9365 02 Fixed Disk1 - 20MB   32XX
08 9630 03 Timer
09 9630 03 Ops Panel Adpt
09 9550 07 Ops Panel Assembly
16 9630 03 Channel Adpt
16 9552 10 Channel Tailgate
21 9311 11 Asynch Emul Adpt
26 9630 03 Terminal Adpt
26 9176 15 Term Mpx Adpt, 00-07
31 9351 14 Token-Ring - 16MB
51 9263 12 Tp1 Concurr. Com-NC
52 9267 13 Tp2 Concurr. Com-WRP
87 9630 03 Processor
87 9482 22 Storage 2MB

Select Test; press ENTER ==> _
PF: 3=Quit 12=Test Menu

```

Figure 2-28. Hardware Configuration Table Example

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

For the Communication Adapters, the XXX = one of the following:

WRP = EIA/V.35 or X.21 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
 INV = An undefined cable or wrap plug is connected.

Display FRU ID Table (FN 05): Presents an unformatted version of the FRU ID table. This function number must be selected when the diagnostics are controlled from the terminal.

Display Test Log Count/Time IML Drive (FN 07): Displays 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.

Online Tests—Configuration B and C

Invoking test mode	2-157
Invoking test mode using CSCF	2-157
Running Configuration B/C Online Tests	2-163
3174 Test Menu—Configuration B/C	2-163
Online Test Format	2-164
Test 0 Configuration B/C: Terminal Check	2-165
Test 1 Configuration B/C: Display Logs Menu	2-166
Test 1, Option 1	2-167
Test 1, Option 2	2-168
Test 1, Option 3,n	2-170
Test 1, Option 4,n,m	2-170
Test 1, Option 5,xxxx	2-170
Test 1, Option 6,n,m	2-170
Test 1, Option 7	2-170
Test 1, Option 8	2-171
Test 1, Option 9,n	2-171
Test 2 Configuration B/C: Configuration Menu	2-172
Test 2, Option 1	2-173
Test 2, Option 2	2-173
Test 2, Option 3	2-174
Test 2, Option 4	2-174
Test 2, Option 5	2-174
Test 2, Option 6	2-174
Test 2, Options 7, 8, and 9	2-174
Test 2, Option 10	2-174
Test 3 Configuration B/C: 3270 Device Status Information	2-175
Test 3, Option 1	2-175
Test 3, Option 2,n,m	2-178
Test 3, Option 3,n,m	2-179
Test 3, Option 4,n	2-183
Test 3, Option 5,n,m	2-184
Test 4 Configuration B/C: Reset Logs and Cable Errors	2-185
Test 4, Option 1,n	2-186
Test 4, Option 2	2-186
Test 4, Option 3	2-186
Test 4, Option 3,m	2-186
Test 5 Configuration B/C: Display Vital Data	2-187
Test 5, Option 1 — Configuration Support B	2-188
Test 5, Option 1 — Configuration Support C	2-190
Test 5, Option 2,p (p=password) — Configuration Support B	2-192
Test 5, Option 2,p (p=password) — Configuration Support C	2-193
Test 5, Option 3,n,m	2-193
Test 5, Option 4,n,m,p	2-195
Test 5, Option 5,n,m	2-196
Test 5, Option 6	2-197
Test 6 Configuration B/C: Display Control Areas	2-198
Test 6, Option 1	2-199
Test 6, Options 2 and 2,n,m	2-200
Test 6, Option 3 (X.21)	2-208
Test 6, Option 4,n,m	2-210
Test 6, Option 5 (X.25)	2-211
Test 7 Configuration B/C: Color Convergence	2-213

Test 8 Configuration B/C: Extended Functions and Programmed Symbols	2-213
Test 9 Configuration B/C: Token-Ring and LAN Tests	2-213
Test 9, Option 1	2-215
Test 9, Option 2 (Token-Ring)	2-217
Test 9, Option 2 (Ethernet)	2-219
Test 9, Option 3	2-220
Test 9, Options 4 and 5	2-220
Test 9, Option 6	2-225
Test 9, Option 7	2-225
Test 9, Option 8	2-225
Test 9, Option 9,u (u=update)	2-227
Test 9, Option 10,u (u=update)	2-229
Test 9, Option 11	2-231
Test 9, Option 12,u (u=update)	2-233
Test 9, Option 13	2-234
Test 10 Configuration B/C: Port Wrap Tests	2-235
Test 10, Option 1,n,m (Direct Wrap)	2-235
Test 10, Option 2,n,m (Multiplexer Wrap)	2-236
Test 11 Configuration B/C: Trace Control	2-236
Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests	2-237
Test 12, Option 1	2-237
Test 12, Option 2	2-240
Test 12, Option 4	2-241
Test 12, Option 5	2-242
Test 12, Option 6	2-242
Test 12, Option 7	2-243
Test 12, Option 8,m,n	2-245
Test A Configuration B/C: Operator-Originated Alerts	2-246
Test D Configuration B/C: Distributed Function Terminal Dump	2-247
Test 13 Configuration B/C: ESCON Adapter Tests	2-248
Test 13, Option 1	2-249
Test 13, Option 2	2-251
Test 13, Option 3	2-251
Test 13, Option 4	2-252
Test 14 Configuration B/C: 3174 Operator Functions	2-253
Test 14, Option 1,n,m,*	2-254
Test 14, Option 2,n,m	2-254
Test 14, Option 3,n,m	2-255
Test 15 Configuration B/C: 3270 Host Status Summary	2-256
Test 16 Configuration C (Only): ISDN Adapter Tests	2-258
Test 16, Option 1	2-259
Test 16, Option 2,h	2-260
Test 16, Option 3,m,n,c	2-261
Test 16, Option 4,m,n,c	2-264
Test 16, Option 5,m,n,c	2-266
Test 16, Option 6,m,n	2-268
Test 17 Configuration C (Only): Advanced Peer-to-Peer Networking (APPN) Tests	2-268
Test 17, Option 1	2-268
Test 17, Option 2	2-270
Test 17, Option 3	2-272
Test 17, Option 4	2-274
Test 17, Option 5	2-276
Test 17, Option 6	2-277
Test 17, Option 7	2-278

Configuration B/C Online Tests

Test 18 Configuration C (Only): Frame Relay Tests	2-279
Test 18, Option 1	2-280
Test 18, Option 2,p	2-280
Test 18, Option 3	2-282
Test 18, Option 4,n	2-283
Test 18, Option 5	2-284
General Procedures	2-288
How to Perform an Operator Panel Lamp Test	2-288
How to Display the Master Menu	2-288
Taking the 3174 Offline	2-290
How to Take the 3174 Model 21L Offline	2-290
How to Place the 3174 Model 21L Online	2-290
How to Force the 3174 Model 21L Offline: Alt 1 Method	2-291
How to Take the 3174 Model 22L Offline	2-291
How to Place the 3174 Model 22L Online	2-291
How to Disconnect the Bus and Tag Cables	2-292
How to Switch the Power On at the 3174 Model 21L	2-292
How to Switch the Power Off at the 3174 Model 21L	2-292
How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)	2-292
How to Perform the Coaxial Cable Ground Loop Check	2-293
Step 1: AC Voltage Check	2-293
Step 2: Coaxial Resistance Check	2-294
Step 3: Terminal Ground Check	2-294
Step 4: Coaxial Cable to Terminal Check	2-295
Measuring the 3174 Enterprise Systems Connection Adapter Transmit and Receive Levels	2-295
Verifying the ESCON Adapter Transmit/Receive Operation	2-295
Modem Specifications and Switch Settings	2-297
IBM 5841 and 5842 Setup	2-298
Hayes Smartmodem 1200 Setup	2-299
Microm Data Modems	2-300
How to Use the 3174 Patch Procedure	2-301
Processing a Patch	2-301
Starting the Patch Procedure	2-301
Adding a Patch	2-304
Adding a Zap Patch	2-307
Processing an Existing Patch	2-309
How to Perform the 3174 Dump Procedure	2-310
Status Codes for Manual Dump	2-311
How to Analyze Dump Completion Codes	2-312
Dump Status Codes Using Test 14	2-314
Event Log Dump Status Codes	2-315
3174 Display Subsystem S/370 OLTs	2-317
Model 21L (SNA) 3174B OLTs	2-317
Applicable Executive Control Program	2-317
Composite Error Message Description	2-317
OLT Routines	2-319
CDS Card Format, Model 21L (SNA)	2-319
Model 21L (Non-SNA) 3174A OLTs	2-319
Applicable Executive Control Program	2-319
Composite Error Message Description	2-320
OLT Routines	2-321
CDS Card Format, Model 21L (Non-SNA)	2-321
Model 21R OLTs	2-322
Applicable Executive Control Program	2-322

Some tests are available only in Configuration Support C; these are identified in the descriptions of the individual tests. If you are not sure of the 3174 microcode release level, invoke online test 5 option 1 (/5,1) and use the online test section that corresponds to the release level shown on the screen.

Online Test Configuration B/C 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). 1TEST is for host IDs 1A–1H, 2TEST is for host IDs 2A–2D, and 3TEST is for host IDs 3A–3D.

If you select a test or option that is not available, one of the following messages is 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, **unless** the terminal is running in control unit terminal (CUT) mode. This test facility can be used during normal subsystem operation and is available after you enter test mode.

Invoking test mode: To enter Test mode, press and hold the **ALT**; then press the **TEST** key on an attached display station keyboard. Select the Online tests by entering one of the test formats shown below or from the 3174 Test Menu shown in Figure 2-29 on page 2-163.

Invoking test mode using CSCF: The Online tests are also selectable through the Central Site Control Facility (CSCF). CSCF allows certain online tests to be run from a NetView* terminal. The NetView operator can test any controller connected to the same host as the operator's terminal by entering the command **CSCF**. (See *NetView Operations*, SC31-6019, for a description of CSCF commands.) You cannot invoke online tests 0, 7, 8, A, and D through CSCF. The options listed on the test menus and execution of the selected tests are the same except:

- The way you enter test mode.
- The test screens contain additional information on the top line.
- The functions assigned to some of the PF keys and unique CSCF PF keys.

Note: If you are trying to invoke an online test through CSCF and you get the message, "This function is valid for xTEST only," you must invoke CSCF with the name of the PU that is connected to host ID 1A–1H, 2A–2D, or 3A–3D. Depending on the configuration of your network, you may not be able to access that PU from your NetView terminal. For example, some tests can only be run on 1TEST. If you try to invoke these tests on 2TEST, you will receive an error message. To run the test on 1TEST, you must invoke CSCF with a PU name that is connected to host ID 1A, 1B, 1C...1H.

Configuration B/C Online Tests

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 2-165.

Test, Option	Description
/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 2-166. The following types of error logs can be displayed:

Test, Option	Description
/1,1,n	Response time log for host ID n (n=1A-1H, 2A-2D, 3A-3D)
/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,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,m	Error statistics for host address n, host ID m (n=0-254, m=1A-1H, 2A-2D, 3A-3D)
/1,7	Change log mode (Normal/Intensive)
/1,8	Event log summary
/1,9,n	Host ID (n=1A-1H, 2A-2D, 3A-3D)

Test 2 (Display Configuration Panels): Provides both hardware and microcode configurations on the controller. For detailed information about Test 2, see page 2-172.

Test, Option	Description
/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 can contain information about one or more of the following: Printer Authorization Matrix, Logical Terminal Assignment, Prompts for Extended VPD, and ISDN Definition
/2,4	AEA and TCP/IP configuration: The AEA and TCP/IP configuration is displayed
/2,5,a,b	Displays the Canonical Names Selection Menu if the Control microcode was created using CSCM (a=1-6, b=1-6)
/2,6	Refreshes the Canonical Names directory
/2,7	Displays the configuration panels for APPN node definition
/2,8	Displays the configuration panels for COS definition
/2,9	Displays the configuration panels for 3174-Peer definition
/2,10	Displays the configuration panels for WAN profiles definition

Test 3 (3270 Device Status Summary): The status of all devices attached to a Terminal Adapter (HG 26 or 27) is displayed. Also, AEA and TCP/IP connectivity information is displayed. For detailed information about Test 3, see page 2-175.

Test, Option	Description
/3,1	Displays Status Summary
/3,2,n,m	Displays error counters for port n on HG m (n=0-31, m=26-27)
/3,3,n,m	Displays connectivity for port n on HG m (n=0-31, m=26-27)
/3,4,n	Displays LU Status Summary for host ID n (n=1A-1H, 2A-2D, 3A-3D)
/3,5,n,m	Displays DLUR connectivity for port n on HG m (n=0-31, m=26-27)

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 2-185.

Test, Option	Description
/4,1,n	Resets the response time logs for host ID n (n=1A–1H, 2A–2D, 3A–3D)
/4,2	Resets the event log, traces, and cable errors on all Terminal Adapters
/4,3	Resets the cable errors on all Terminal Adapters
/4,3,m	Resets the cable errors for HG m (m=26–27).

Test 5 (Display Vital Product Data): Provides the ability to display and update information about the controller, ports, and microcode. Test 5 also provides product data for attached terminals. For detailed information about Test 5, see page 2-187.

Test, Option	Description
/5	Display Vital Data Menu
/5,1	Display Controller Vital Data
/5,2,p	Update Controller Vital Data
/5,3,n,m	Display Port Vital Product Data (n=port number 0–31, m=hardware group 21–23, 26–27)
/5,4,n,m,p	Update Port Vital Product Data (n=port number 0–31, m=hardware group 21–23, 26–27, p=password)
/5,5,n,m	Display Extended Vital Product Data (n=port number 0–31, m=hardware group 21–23, 26–27)
/5,6	Update Extended Vital Product Data.

Test 6 (Display Control Areas): The port control areas and host control data are displayed. Also all logical terminal extensions (if any) and AEA bit definitions are displayed by pressing PF8 For detailed information about Test 6, see page 2-198.

Test, Option	Description
/6,1,n	Register page (n=0–3F)
/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 (n=0–31, m=21–23, 26–27)
/6,3	X.21 SHM Control Data
/6,4,n,m	LT n Control Area on Host ID m (n=0–254, m=1A–1H, 2A–2D, 3A–3D)
/6,5	X.25 Control Data.

Test 7 (Color Convergence): For more information, see page 2-213.

Test 8 (Extended Functions and Program Symbols): For more information see page 2-213.

Configuration B/C Online Tests

Test 9 (Token-Ring and LAN Tests): Provides the ability to display the status of the LAN network, the LAN adapter status counters, and attached links. Test 9 also provides the ability to reset the LAN network and attached link status counters. Options 9 through 13, which are available only in Configuration C, are the 3174 Peer communication online tests. For detailed information about Test 9, see page 2-213.

Test, Option	Description
/9,1	Monitor LAN status
/9,2	Display LAN adapter status summary
/9,3	Reset LAN adapter status counters
/9,4	Display link status summary for all links
/9,5,*	Display link status summary
/9,6	Reset link status counters for all links
/9,7,*	Reset link status counters
/9,8	Display gateway host status summary
/9,8,h	Display host status summary for host ID h
/9,9,u	Display and update 3174-Peer status (u=update, password required for update)
/9,10,u	Display and update 3174-Peer bridge profile (u=update, password required for update)
/9,11	Display 3174-Peer bridge status
/9,12,u	Display and update LAN Manager profile (u=update, password required for update)
/9,13	Reopen the LAN adapter if closed (password required)

* =n or h or h,n (where n=link address and h=host ID)

Test 10 (Port Wrap Tests): Provides a port wrap test for Terminal Adapter ports (00, 08, 16, 24), TMA ports 00–31, and 3299 Models 2, 3, and 32, ports 00–31. For detailed information about Test 10, see page 2-235.

Test, Option	Description
/10,1,n,m	Direct wrap for a specific Terminal Adapter port on a specific Terminal Adapter (n=0–31, m=26–27)
/10,2,n,m	3299/TMA port wrap on a specific Terminal Adapter (n=0–31, m=26–27).

Test 11 (Trace Control): Provides an internal trace capability. This function is available only to service personnel.

Test 12 (Asynchronous Emulation Adapter and TCP/IP Tests): Provides access to a test for an Asynchronous Emulation Adapter, port, terminal, or programmable modem. It provides a status summary and capability to reset error counters on any or all Asynchronous Emulation Adapters. Also, AEA and TCP/IP connectivity information is displayed. For detailed information on Test 12, see page 2-237.

Test, Option	Description
/12,1	AEA Port Tests Menu
/12,2	Display status summary
/12,3	Reset line errors on all AEA HGs
/12,3,n	Reset line errors on HG n.
/12,4,m,n	Display error counters for port m on HG n (m=0–7, n=21–23)
/12,5,m,n	Display connectivity for port m HG n (m=0–7, n=21–23)
/12,6,m,n	Wrap port m on HG n (m=0–7, n=21–23)
/12,7,m,n	Test cable — port m on HG n (m=0–7, n=21–23.)
/12,8,m,n	Test cable —
	Display the DLUR connectivity for AEA port m on HG n (m=0–7, n=21–23.)

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controllers.

Test, Option	Description
/A,n	Alerts to host n (n=1A–1H, 2A–2D, 3A–3D.)

For detailed information about Test A, see page 2-246.

Test D (Dump Device): Provides a device dump capability for distributed function terminals such as a 3290. For detailed information about Test D, see page 2-247.

Test, Option	Description
/D,n,m	DFT dump for port n on HG m (n=0–31, m=26, 27.)

Test 13 (Enterprise Systems Connection (ESCON) Adapter Tests): Allows you to run an adapter internal or external wrap test, send OLS over the fiber optic cables, display a status summary, or reset error counters. For detailed information on Test 13, see page 2-248.

Test, Option	Description
/13,1	Display adapter status
/13,2	Reset error counters
/13,3	Run Adapter Internal wrap test
/13,4	Run Adapter External wrap test.

Test 14 (3174 Operator Functions): Allows you to IML the controller and to reset the time on the 3174 internal clock. For more information about Test 14, see page 2-253.

Test, Option	Description
/14,1,n,m,*	IML (n=drive: 1,2,3,4,or 8; 8=search order 3,4,1,2) (m=IML type: 41=Normal, 42=Back Level, 43=Trial). (44=Dump the Controller) (*=Delayed IML)
/14,2,n,m	Set Time (n=hours: 24 hour clock; m=minutes.)
/14,3,n,m	Copy Dump data from fixed disk to dump diskette.

Test 15 (3270 Host Status Summary): Allows you to view the operational status of the hosts configured for the 3174. This test can be run from 1TEST, 2TEST, and 3TEST. For more information about Test 15, see page 2-256.

Test 16 (ISDN Adapter Tests): Allows you to check the status of the ISDN Adapter, to check the host status, and port wrap test the ISDN Adapter. For more information about Test 16, see page 2-258.

Test, Option	Description
/16,1	Displays the ISDN Adapter status summary
/16,2,h	Displays the host status summary for host ID h (h=1A–1H). The number of customized links and the host address range for the specified host are shown
/16,3,m,n,c	Displays performance counters for port m, HG n, channel c (m=0–3, n=36–39, c=D,B1,B2)
/16,4,m,n,c	Displays error counters for port m, HG n, channel c (m=0–3, n=36–39, c=D,B1,B2)
/16,5,m,n,c	Allows you to display the error counter switch and error counter offset values for port m, HG n, channel c (m=0–3, n=36–39, c=D,B1,B2); you may change these values if you have the password (set in configuration question 98)
/16,6,m,n	Wrap port m on HG n (m=0–3, n=36–39.)

Configuration B/C Online Tests

Test 17 (APPN Tests): This test allows you to view status information for the components of the APPN network. For more information about Test 17, see page 2-268.

Test, Option	Description
/17,1	Displays the APPN node status
/17,2	Displays the adjacent APPN nodes
/17,3,N.C	Displays the link status for a link (N.C=NETID.CPNAME)
/17,4,(x)	Displays the session status (x=Status Type; P=Pending, A=Active, T=Terminating)
/17,5,P.N.C	Displays a pending session route (P.N.C=PCID.NETID.CPNAME)
/17,6	Displays active locate requests
/17,7	Displays session status of all LU 6.2 sessions that have an endpoint in the 3174

Test 18 (Frame Relay Tests): For more information about Test 18, see page 2-279.

Test, Option	Description
/18,1	Displays Frame Relay port summary information.
/18,2	Allows you to update Frame Relay parameters.
/18,3	Displays the Data Link Control Identifiers (DLCI) status and data types.
/18,4	Displays a status summary for the Data Link Control Identifier (DLCI).
/18,5	Displays a link status summary for all links

Running Configuration B/C Online Tests

The remainder of this section is dedicated to describing each online test, its options, and how to run each test.

3174 Model References

The following Online Tests descriptions support all 3174 models. References to models other than the ones you have may be listed in the text and on the example screens.

3174 Test Menu—Configuration B/C

The 3174 Test Menu is shown in Figure 2-29. (Note that this is a two page panel). To display this menu, perform the following steps at any 3278 or similar display:

1. Press and hold **ALT**; press **Test**.
2. Press **PF12**, **Clear**, or **PA2**.

_____ 3174 Test Menu (XTEST) _____		
Test	Description	(Page 1 of 2)
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	LAN tests	
10	Port wrap tests	
11,p	Trace control (p=password)	
12	AEA and TCP/IP tests	
A,n	Alert to host n (n=1A-1H, 2A-2D, 3A-3D)	
D,n,m	Dump device on port n, HG m (n=0-31, m=26-27)	

Select test; press ENTER ==> _

PF: 3=Quit 8=Fwd

Figure 2-29 (Part 1 of 2). 3174 Test Menu

Configuration B/C Online Tests

3174 Test Menu (XTEST)		(Page 2 of 2)
Test	Description	
13	Enterprise Systems CONnection (ESCON) Adapter tests	
14	3174 Operator Functions	
15	Display 3270 Host Status Summary	
16	Integrated Services Digital Network (ISDN) tests	
17	Advanced Peer-to-Peer Networking (APPN) tests	
18	Frame Relay tests	

Select test; press ENTER ---> _
PF: 3=Quit 7=Back

Figure 2-29 (Part 2 of 2). 3174 Test Menu

Notes:

1. In the screen title, (XTEST): X = 1, 2, or 3 (for example, 2TEST).
2. For Configuration Support B, the title of Test 9 is Token-Ring Test.
3. Tests 16 and 17 appear on the menu for Configuration C only.

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 = values required by some test menus.

For example:

A test entry of /1,2 displays all log records.
A test entry of /1,3,2 displays the log records for HG02.

These tests can also be selected by entering the following:

Example 1

1. Enter /1 from any select line.
The Logs Menu is displayed.
2. Enter 2 from the select line of the Event Log Menu.
All log records are displayed.

Example 2

1. Enter **/1** from any select line.
The Logs Menu is displayed.
2. Enter **3,2** from the select line of the Event Log Menu.
The log records for HG02 are displayed.

Test 0 Configuration B/C: Terminal Check

This test can be run from 1TEST, 2TEST, and 3TEST and it checks the requesting terminal's basic functions (such as highlighting, nondisplay, and insertion), and 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 **/0** or **/**
3. Press **Enter**. The test pattern shown in Figure 2-30 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

Figure 2-30. Test 0: Terminal Check Panel

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.

The following terminal functions are tested:

- High-intensity function
- Nondisplay function

Configuration B/C Online Tests

- Selector pen (if one is present)
- 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 present).

Test 1 Configuration B/C: 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 2-31, 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. Type in the option number.
5. Press **Enter**.

Note: *Options 2–6 and 9*

These options can be run only from 1TEST. Similar panels are displayed when options 2, 3, 4, 5, 6, or 9 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.

_____ Logs Menu _____		
Option	Description	(Current log mode: Normal)
1,n	Response time log for host ID n (n=1A–1H, 2A–2D, 3A–3D)	
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	Host Address n, host ID m (n=0–254,m=1A–1H,2A–2D,3A–3D)	
7	Change log mode (normal/intensive)	
8	Event log summary (by category and hardware group)	
9,n	Host ID (n=1A–1H, 2A–2D, 3A–3D)	

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

PF: 3=Quit `12=Test menu

Figure 2-31. Test 1 Menu

Test 1, Option 1: Displays the response time monitor (RTM) log for the specified host ID if the controller is configured for RTM. Valid host IDs for 1TEST are 1A–1H, for 2TEST 2A–2D, and for 3TEST 3A–3D.

If the 3174 has been configured for local display of the RTM log and the host has enabled this function, this option allows an operator to show the RTM log on authorized displays (except terminals such as the 3290). Customization Question 127 may limit access to this test to ports 26-00 and 27-00 only. For more information about RTM, refer to the *3174 Planning Guide*.

Type **1,n** (n=1A–1H, 2A–2D, 3A–3D) to select the Response Time Monitor (RTM) from the Logs Menu. An example of the Response Time Monitor log is shown in Figure 2-32.

Response Time Log – Host ID xx _____

Host Addr	DEFINITION	CTR#1	BDY#1	CTR#2	BDY#2	CTR#3	BDY#3	CTR #4	BDY#4	OVER
002 i b d3		00000	11:01.0	00000	10:12.0	00000	11:15.0	00000	11:10.0	00000
006 _ b d3		00000	0.5	00000	2.0	00000	5.0	00000	10.0	00000
008 p _ 3		00000	1.0	00000	2.0	00000	5.0	00000	10.0	00000
032 v b d1		00000	1.0	00000	11:01.0	00000	5.0	00000	10.0	00000
065 i d d2		00000	1.0	00000	2.0	00000	5.0	00000	10.0	00000
099 v _ 3		00000	0.5	00000	2.0	00000	11:01.0	00000	10.0	00000
107 v b d3		00000	1.0	00000	2.0	00000	5.0	00000	10.0	00000
200 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 2-32. Example of an RTM Log Panel—Configuration Support B

Where: xx = The selected host ID

The example shows representative information for the first eight logical terminals. Each time the PF8 key is pressed, the next group of eight logical terminals is displayed. If the 3174 is not customized for RTM, the display station keyboard is inhibited.

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

Configuration B/C Online Tests

BDY#4 = Fourth boundary in minutes and seconds

OVER = 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,n 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,n is entered, a message appears stating the function is not supported for this configuration. See "Test 4 Configuration B/C: Reset Logs and Cable Errors" on page 2-185.

Test 1, Option 2: Displays all the errors in the event log. Figure 2-33 shows an example of the this panel.

```

_____ Log Records - All _____
(Relative 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  0315 58  16                1A   9210 1100 01
000 00:05  0384 05  99                1B   0387 0385
000 00:03  0500 01  16                1A
000 00:02  0503 01  16                1A
000 00:02  0853 03  31                0812 0007 CPNA ME00
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                9052 1900
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    7=Back    8=Fwd    12=Test Menu
```

Figure 2-33. Example of a Log Record Display Panel

Relative Day/Time: The Relative Day/Time value shows the setting of the 3174 interval timer when the request to display the log is entered. Because the interval timer is reset to zeros when the controller power is switched off and on, it also shows the elapsed time since the controller was switched on. This timer can be set to the actual time of day using an offline test or online test /14,2. If the timer is set, the value in the Time field then represents the actual time of day rather than the elapsed time since the controller was switched on. 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 Relative Day/Time represents the day and time of the last power on sequence when the log event occurred.

SC Field: Contains the base status code that was logged. See the *3174 Status Codes* for the recovery action.

QA Field: Contains the qualifier associated with the base status code.

PHG and CHG Fields: Are the Primary Hardware Group and Connection Hardware Group contain the hardware group associated with the error that occurred. For example, if a 3278 terminal is attached to a TMA in a 3174 Model 1L, the PHG is HG26 and the CHG is 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	27	Terminal Adapter
01	Diskette 1/File Adapter	27	Terminal Multiplexer Adapters
02	Diskette 2/File Adapter	27	Fiber Optic Terminal Adapter (FTA)
03	Fixed Disk 1	31	Token-Ring Adapter
04	Fixed Disk 2	36	ISDN Adapter
07	RAM Disk (See Note)	37	ISDN Adapter
08	Timer	38	ISDN Adapter
09	Operator Panel	39	ISDN Adapter
11	Communication Adapter	41	Ethernet Adapter
16	Channel Adapter	46	Encrypt/Decrypt Adapter
16	Channel Driver/Receiver	51	Concurrent Communication Adapter
17	Enterprise Systems Connection Adapter	52	Concurrent Communication Adapter
21	Asynchronous Emulation Adapter	80	Test Monitor
22	Asynchronous Emulation Adapter	81	Test All CSU Mode
23	Asynchronous Emulation Adapter	82	Test All Installed Mode
26	Terminal Adapter	87	Processor/Storage
26	Terminal Multiplexer Adapters	99	Unassigned Hardware Group
26	Fiber Optic Terminal Adapter (FTA)		

Note: The RAM Disk (HG 07) is available only on the 8250 Workstation Networking Module. Refer to the &sg..

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.

PN Field: PN = The port number is used with the PHG and CHG fields in the Log Records menu. This field is not displayed at the operator panel.

ID Field: ID = The identifier of the host that was active when the status code was logged.

HA Field: HA = The Host Address, if the error is related to an attached device. Certain terminals can use multiple logical terminals function, such as a 3278. This allows one terminal to establish from one to five sessions with one or more hosts.

Extended Data Fields (B1—B16): The extended data fields contain information that can be used to resolve a problem, such as TYPE and LOCA of the failing FRU, or the failing bytes in a data stream error. If the controller is configured as an APPN node, for most errors, you can see the CPNAME displayed in

Configuration B/C Online Tests

this field in alphanumeric characters. To determine the definition of the extended data (B1–B16), see the *3174 Status Codes*. 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 = 0315 5816 00 9210 1100 01

0315 = Status code
5816 = Qualifier and hardware group
00 = PN (none associated with this log entry)
9210 = FRU Type number
1100 = Location of the FRU
01 = Interrupt Level

To find this status code in the status code chart, look for status code 0315 with a QA field of 58. See Figure 2-33 on page 2-168 for an example of the extended data field.

Status Code Entry = 0315 58HG B1B2 B3B4

0315 = Status code
58HG = Qualifier and hardware group
B1B2 = FRU Type Number
B3B4 = Location of the FRU
B5 = Interrupt Level

Note that the PN field is not shown in the status code chart.

Test 1, Option 3,n: Displays all errors in the event log for the hardware group selected (n=a specific hardware group number from 0 to 99).

Test 1, Option 4,n,m: Displays errors in the event log for the port number on the specific hardware group selected (n=a specific terminal port number from 0 to 31; m=a specific hardware group number from 0 to 99).

Test 1, Option 5,xxxx: Displays all the status codes represented by xxxx that occurred since the last time the logs were reset. 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 is searched and all 501 status codes displayed.

Test 1, Option 6,n,m: Displays all errors in the event log for the logical terminal number on the host ID that was selected (n=a specific host address number from 0 to 254, m=a specific host ID number from 1A–1H, 2A–2D, or 3A–3D.).

Test 1, Option 7 Used this option 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 logged errors that are not recorded in Normal mode. Because of the high frequency of the errors, Intensive mode should be used only when needed. To guard against continued use, the controller changes the log mode back to Normal when a 76-hour timer expires.

Note: This test can be run only from 1TEST.

Test 1, Option 8: Provides a single panel of error log summary information. All current log records, both internal and on diskette or fixed disk, are divided into the event categories. A breakdown by Hardware Group (HG) is under each category.

Note: This test can be run only from ITEST.

Figure 2-34 on page 2-171 shows an example of the panel displayed if you select this option.

Event Log Summary						
Category	Machine Check	Program Check	Comm Check	Media Check	Port Check	Other
Total	2	1	2	6	4	12
Subtotal by HG	HG 26 1 00 1	HG 00 1	HG 16 2	HG 02 2 99 3 01 1	HG 26 4	HG 02 2 26 10

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

PF: 3=Quit 12=Test menu

Figure 2-34. Example of an Event Log Summary Panel

Test 1, Option 9,n: Displays all events logged for a specific Host ID.

Notes:

- 1A to 1H identifies from one to eight hosts that can be configured for the token-ring adapter on Models 3R, 13R, 23R, 53R, and 63R, through the Enterprise Systems Connection Adapter (ESCON Adapter) on Model 12L or 22L, or through a Type 1 or Type 2 Communication Adapter on an X.25 network. See the 3174 Planning Guide for details.
- 2A-2D or 3A-3D identifies a host link through a Concurrent Communication Adapter.

Test 2 Configuration B/C: Configuration Menu

This test can be run only from 1TEST. Test 2 provides information about hardware configuration, configuration questions, device definition information, and the Asynchronous Emulation Adapter configuration. When Test 2 is selected, the menu shown in Figure 2-35 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	Device Definition
4	AEA and TCP/IP configuration
5,a,b	Canonical Names display (a=1-6, b=1-6)
6	Canonical Names directory refresh
7	APPN configuration questions
8	COS configuration questions
9	3174-PEER configuration questions
10	WAN configuration questions

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

PF: 3=Quit 12=Test menu

Figure 2-35. Test 2: Configuration Menu

Test 2, Option 1: Displays the Hardware Configuration Table.

Figure 2-36 shows an example of this table.

This table shows the configuration for a remotely attached model. Only those FRUs that are physically installed are displayed in this table.

Hardware Configuration Table

HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
00	9001	00	Invalid Card/Cond		87	9500	18	Processor	
01	9154	21	File Adpt		87	9053	19	Storage 2MB	
01	9114	01	Diskette 1 - 2.4MB						
02	9114	02	Diskette 2 - 2.4MB						
03	9132	03	Fixed Disk 1 - 20MB	32XX					
04	9132	04	Fixed Disk 2 - 20MB						
08	9500	18	Timer						
09	9010	05	Ops Panel Adpt						
09	9521	06	Ops Panel Assembly						
11	9253	22	Type 1 Com Adpt-XXX						
21	9331	14	Asynch Emul Adpt						
21	9540	61	AEA Cable Assembly						
26	9154	21	Terminal Adapter						
26	9172	17	Term Mpx Adpt 00-07						
27	9155	23	Terminal Adapter						
27	9172	11	Term Mpx Adpt 00-07						
41	9344	16	Ethernet Adpt						

Select Test; press ENTER ==> _

PF: 3=Quit 12=Test Menu

Figure 2-36. Example of a Hardware Configuration Table Panel

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.)

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

WRP = EIA 232D/V.35 or X.21 wrap plug is connected

V.35 = V.35 cable is connected

EIA 232D = EIA 232D cable is connected

NC = Nothing is connected

X.21 = X.21 cable is connected

INV = An undefined cable or wrap plug is connected.

Test 2, Option 2: Displays the configuration panels (except panel 118). How the 3174 was customized determines which configuration panels are displayed here. Panels are only displayed for customized options. For more information, see the *3174 Planning Guide*.

Configuration B/C Online Tests

Test 2, Option 3: Displays device definition information.

Depending on how the controller is configured, information is displayed for one or more of the following panels:

- Printer Authorization Matrix
- Logical Terminal Assignment
- Prompts for Extended Vital Product Data.
- ISDN Configuration.

This information is presented in the sequence shown in the list above. Press PF8 to page forward to the information you wish to view. For more information see the *3174 Planning Guide*.

Test 2, Option 4: Displays the Asynchronous Emulation Adapter and TCP/IP configuration panels. For more information, see the *3174 Planning Guide*.

Test 2, Option 5: Displays the Canonical Names of the microcode modules installed on the Control disk. It applies only if Central Site Change Management is being used. For more information, see "Displaying Data Object Canonical Names" in the *3174 Central Site Customizing User's Guide*.

Test 2, Option 6: Refreshes the Canonical Names directory after a change has been made. It applies only if Central Site Change Management is being used. For more information, see "Displaying Data Object Canonical Names" in the *3174 Central Site Customizing User's Guide*.

Test 2, Options 7, 8, and 9: Displays the configuration panels for APPN node definition, COS definition, or 3174-Peer definition. How the 3174 was customized determines which configuration panels are displayed here. Panels are only displayed for options that are customized and not deconfigured.

| **Test 2, Option 10:** Displays the configuration panels for the WAN profiles definition.

Test 3 Configuration B/C: 3270 Device Status Information

Test 3 provides the status of all configured devices that are attached to the controller using a Terminal Adapter, a Terminal Multiplexer Adapter, or a Fiber Optic Terminal Adapter. An IML from the Control disk must be completed before this test can be selected. If 2TEST or 3TEST is displayed, only Option 4 can be used. Perform the following procedure at any 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/3**
3. Press **Enter**; the Device Status menu is displayed.
4. Type in the option number.

Figure 2-37 shows the Device Status menu.

_____ 3270 Device Status Menu _____	
Option	Description
1	Display status summary
2,n,m	Display error counters for port n on HG m (n=0-31, m=26-27)
3,n,m	Display connectivity for port n on HG m (n=0-31, m=26-27)
4,n	Display LU status summary for host ID n (n=1A-1H, 2A-2D, 3A-3D)
5,n,m	DLUR Display connectivity for port n on HG m (n=0-31, m=26-27)

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

PF: 3=Quit 12=Test menu

Figure 2-37. Test 3: 3270 Device Status Menu

Note: Information about HG 27 applies to 1TEST only.

Test 3, Option 1: Displays status summary for all attached devices. Figure 2-38 on page 2-176 shows an example of a status summary panel.

Note: This test is available only from 1TEST.

Configuration B/C Online Tests

```

_____ 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 d          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 g ? v v v p          e p p v v e v v v v i i v v v
Cable     . . . . . : . .          / . . . / . . . . . . . . .
Cable Max. . . . . * : . .          / . . : * . : . . . . : : *

```

```

d = direct          1 = on          v = video display    . = 0 errors
x = unconfigured   0 = off         p = printer          : = 1-5 errors
m = multiplexer-8  - = off(error) c = combination     / = 6-15 errors
M = multiplexer-32 ? = unknown    i = DFT device      * = > 15 errors
g = 3174-Peer      e = DFTE device

```

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

PF: 3=Quit 5=Refresh 8=Fwd 12=Test menu

Figure 2-38. Example of a Status Summary Panel

Note: To view summary information for HG 27, page forward using the PF8 key. To page back to HG 26, press PF7. To update the panel you are viewing, press PF5.

If any of the following conditions are met, no port status information is displayed:

- The Terminal Adapter (HG 26 or 27) is missing; the message (Not present) is displayed.
- The Terminal Adapter is disabled; the message (Disabled) is displayed.
- The Terminal Adapter in HG 27 was deconfigured; the message (Deconfigured) is displayed.

Port Address: Shows the terminal port number.

- For Models 1L through 24R ports 0–31 are displayed
- For Models 51R through 64R ports 0–15 are displayed
- For Models 81R through 92R ports 0–07 are displayed.

Attach: Shows the attached device.

Note: When a 3299 Model 32 is attached to port 0 on the Terminal Adapter, normally you see an M for all 32 ports. However, if no devices on ports 8–31 are powered on, a question mark (?) may appear for those ports instead of the M. A d or m appears instead of the M for ports between 8–31 if a device is powered on and attached to the Terminal Adapter either directly or through a 3299 Model 1, 2, or 3 even though the Model 32 is attached to port 0.

- d The terminal is attached directly to the Terminal Adapter.
- m The terminal is attached through a 3299 Model 1, 2, or 3 Terminal Multiplexer or TMA.
- M The terminal is attached through a 3299 Model 32 Terminal Multiplexer.
- x A terminal that has not been configured.

? When displayed on this line under port 00, 08, 16, or 24, 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 or a TMA.

Status: Shows 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 power is off or the terminal is 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.

Terminal: Shows the type of device connected.

- ? The device attached to this port has not been communicating with the 3174. The terminal on this port is not switched 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,i, or e The display or video (v), printer (p), DFT (i), or DFTE device (e) for this port has a known history of communicating with the 3174.
- c The device connected to this port is a combined display/printer device. The printer is host-addressable.
- g The device connected to this port has a known history of communicating with the control unit as a 3174-Peer device.

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. 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 switched 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 are reset only by IML and online test /4 options 2 and 3.

Test 3, Option 2,n,m: Displays error counters for the specified port (n) and HG (m) (n=0–31, m=26–27). Figure 2-39 is an example of the error counters for the port specified by the parameters.

Note: This option can be run only from 1TEST.

```
_____ 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 2-39. Example of an Error Counters Panel Showing a Disabled Adapter and Disabled Port

Poll/Read Time Out: Records the number of errors that occur when a device does not respond to the controller within 50 microseconds. The controller can allow up to 100 microseconds to respond if it was customized to do so.

Poll/Read Parity: Records the number of errors that occur when a portion of data is lost during transmission to the controller.

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. 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 switched 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 are reset only by IML and online test /4 options 2 and 3.

Test 3, Option 3,n,m: Displays connectivity data for the specified port (n) and HG (m) (n=0–31, m=26–27). Figure 2-40, Figure 2-41 on page 2-180, and Figure 2-44 on page 2-182 are examples of connectivity status. The status of the device determines which panel is displayed.

Note: This option can be run only from 1TEST.

```

_____ 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   Addr  IDn    HG_PN  Host/Station Name

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

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

Figure 2-40. Example of a Connectivity Panel Showing an Enabled Adapter and Host Unconfigured

Configuration B/C Online Tests

Connectivity for PN 11, HG 27

Adapter (HG) status: Enabled
Port (PN) status: Powered on
Device Type: Video display (MLT)

Current connectivity-

	LT	Bound	Host Addr	IDn	HG_PN	Host/Station Name
	1	Yes	111	1A1	11	RALVM11
	2	n/a	n/a	n/a		009.067.007.200 (See note below)
Active	3	n/a	n/a		22_07	THE SOURCE
Skip	4					not connected (See note below)
	5	n/a	n/a	n/a		Telnet Local Mode

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

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

Figure 2-41. Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Display

Notes:

- 009.067.007.200 shown for LT 2 Host/Station Name in Figure 2-41 is an example of an IP address for a TCP/IP host.
- If the default workgroup setup is used, then Skip is displayed in front of any skipped LTs. If at least one non-default workgroup is defined, then a message is displayed to indicate any skipped workgroup.


```

_____ Connectivity for PN 02, HG 26 _____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device Type               Video display (MLT) with attached Printer

Current connectivity-

      LT  Bound  Host
      IDn  HG_PN  Host/Station Name
Active 1   No   004   1A1   31   RALVM11
      2   No   026   2A2   51   RALVM13
      3
      4   Printer attached, LT skipped
      5   LT not defined
      P   No   004   2A1   51   LT not defined
      RALVM13

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

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

Figure 2-42. Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Display with Host Addressable Printer

```

_____ Connectivity for PN 10, HG 26 _____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device Type               Printer

Current connectivity-

      LT  Bound  Host
      IDn  HG_PN  Host/Station Name
Active 1   No   012   1A1   31   RALVM11
      2   No   012   2A1   51   RALVM13
      3   No   058   2A2   51   RALVM13
      4   No   087   1A5   31   RALVM11
      5

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

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

Figure 2-43. Example of a Connectivity Panel Showing an Enabled Adapter and Working MLT Printer

Configuration B/C Online Tests

_____ Connectivity for PN 03, HG 26 _____

Adapter (HG) status: Enabled
Port (PN) status: Powered on
Device Type 3174-Peer device

Current connectivity-

	LT	Bound	Host Addr	IDn	HG_PN	Host/Station Name
|	1					
|	2					
|	3					
|	4					
|	5					

(Connectivity information not available for Device type)

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

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

Figure 2-44. Example of a Connectivity Panel Showing an Enabled Adapter for 3174-Peer

Test 3, Option 4,n: Displays LU status summary for the specified host ID (n=1A-1H, 2A-2D, 3A-3D). Figure 2-45 shows an example of this panel. The test you entered from (1TEST=1A-1H, 2TEST=2A-2D, 3TEST=3A-3D) is reflected by the ID at the top of the panel.

```

_____ ID 1C LU 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

Terminal  e c v g ? v v v p g g v g v v v e p p v v e v v v v v i i v v v
LU        + + + n   +   + n n + n           +           +       +

```

```

p = printer          i = DFT device          + = in session
v = video display   e = DFTE device          n = not 3174 managed
c = Combination     ? = unknown
g = 3174-Peer

```

Connection number: Outgoing call 999 555 1234

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

PF: 3=Quit 5=Refresh 8=Fwd 12=Test menu

Figure 2-45. Example of an LU Status Summary Panel

Note: To view summary information for HG 27, page forward using the PF8 key. To page back to HG 26, press PF7. To update the panel you are viewing, press PF5.

If any of the following conditions are met, no status information is displayed:

- The Terminal Adapter (HG 26 or 27) is missing; the message (Not present) is displayed.
- The Terminal Adapter is disabled; the message (Disabled) is displayed.
- The Terminal Adapter in HG 27 was deconfigured; the message (Deconfigured) is displayed.

LU: This line applies only for 3174s running SNA. It shows whether the SNA session is bound and active. For MLT ports, the + is displayed if any SNA session is active on the specified host ID.

Connection Number: This field only appears when the 3174 is configured for X.21 or X.25. One of the following messages can follow the connection number:

1. Outgoing Call, followed by the called number. 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.
2. Direct Call (X.21 only.)
3. 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, there is no incoming call number.

Note: See Figure 2-38 on page 2-176 for an explanation of other fields shown on the panel.

Configuration B/C Online Tests

- | **Test 3, Option 5,n,m:** Provides a facility to display the DLUR connectivity for a specified
| 3270-dependent LU device (n=0-31, m=26-27). Figure 2-46 shows an example of an enabled adapter
| and a 3270 display secondary LU connected to a primary LU in an APPN DLUR network.
| **Note:** This option can be run only from 1TEST.

```
|
|           _____ DLUR Connectivity for PN * , HG * _____
|
| Adapter (HG) status:           Enabled
| Port (PN) status:             Powered on
| Device Type:                  Video Display (MLT)
|
| Current connectivity--
|
|      LT   LU Name   DLUS CPNAME   PLU CPNAME   PLU-SLU Link ID
|      1    APPLVM13  DLUSNM12.NETID502  PLUNM012.NETID502   22
|      2
|      3
|      4    APPLVM29  DLUSNM12.NETID502  PLUNM012.NETID502   22
|      5
```

- | To go directly to other tests, enter: /Test,Option
| Select test; press ENTER ===>_
| PF: 3=Quit 12=Test menu
|

| *Figure 2-46. Example of a DLUR Connectivity Panel Showing DLUR LU Status*

- | **LU Name:** The network name of the secondary logical unit received in the ACTLU request from the
| DLUS.
| **DLUS CPNAME:** Identifies the fully qualified Control Point name of the DLUS node.
| **PLU CPNAME:** Identifies the fully qualified Control Point name of the node containing the primary logical
| unit (application).
| **PLU-SLU link ID:** Identifies the link on which the PLU-SLU session exists.

Test 4 Configuration B/C: Reset Logs and Cable Errors

Test 4 resets the response time logs, the event logs, traces, and cable errors. If 2TEST or 3TEST is displayed, use only Option 1,n.

Note: Do not select the options on this menu unless you want to reset 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**; the Reset Log menu is displayed.
4. Type in the option number.

Figure 2-47 shows the Reset Log menu.

Reset Log Menu	
Option	Description
1,n	Reset response time logs for host ID n (n=1A-1H, 2A-2D, 3A-3D)
2	Reset event log, traces, and cable errors for all TAs
3	Reset cable errors for all TAs
3,m	Reset cable errors for HG m (m=26-27)

To go directly to other tests, enter: `/Test,Option`
 Select option; press ENTER `====> __`

PF: 3=Quit 12=Test menu

Figure 2-47. Test 4: Reset Log Menu

Configuration B/C Online Tests

Test 4, Option 1,n: Resets the response time log for a particular host (n=1A–1H, 2A–2D, 3A–3D). If you are in 1TEST the host IDs are 1A–1H, 2TEST is 2A–2D, and 3TEST is 3A–3D.

All log information is reset except the customized boundaries, the customized RTM definitions, and pending transaction status. Customization Question 127 may limit access to this test to ports 26-00 and 27-00 only. For more information about planning for RTM, refer to the *3174 Planning Guide*.

Test 4, Option 2: Resets the event logs, traces, and cable errors for all installed Terminal Adapters that are not deconfigured.

Note: This option is valid only from 1TEST.

Test 4, Option 3: Resets only the cable errors for all installed Terminal Adapters that are not deconfigured.

Note: This option is valid only from 1TEST.

Test 4, Option 3,m: Resets cable errors for the selected hardware group only if it is not missing or deconfigured. Valid numbers are HG 26 and HG 27.

Notes:

1. To reset cable errors on an individual port, turn the power off and then back on again at the terminal connected to that port.
2. To reset line errors on ASCII terminals, use Test 12, Option 3 or 4.
3. HG 27 applies to 1TEST only.

Test 5 Configuration B/C: Display Vital Data

The panel shown in Figure 2-48 displays controller information such as model number, serial number, and EC level. Updates to your information can be entered using the test options. Perform the following procedure at any 3178 or similar display station.

1. Press and hold **ALT**; press **TEST**.
2. Type in **/5**
3. Press **Enter**; the Vital Product Data menu is displayed.
4. Type in the option number.
5. Press **Enter**.

Option	Description
_____ Vital Product Data Menu _____	
	Controller Vital Product Data
1	Display
2,p	Update
	Port Vital Product Data
3,n,m	Display
4,n,m,p	Update
	Extended Vital Product Data
5,n,m	Display
6	Update
	(n = port number = 0-31)
	(m = hardware group = 21-23, 26-27)
	(p = password)
To go directly to other tests, enter: /Test,Option	
Select option; press ENTER ==> _	
PF: 3=Quit 12=Test menu	

Figure 2-48. Example of a Vital Product Data Menu

Notes:

1. The "p" appears only if the 3174 is customized for a password (set in configuration question 98.)
2. HGs 21-23 and 27 are valid for 1TEST only.
3. HGs 21-23 apply to options 3 and 4 only.

Configuration B/C Online Tests

Test 5, Option 1 — Configuration Support B: Displays vital data for your controller. Figure 2-49 shows an example for a controller running Configuration Support B microcode. If this test was entered from 2TEST or 3TEST, the model number and DSL information will not be shown.

```

_____ Controller Vital Data _____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:      11R                      Active
Controller ID:     1234567  Patches          RPQs
Microcode Release: B0400
Maintenance Release: 90115    123456  112361  112371  8K125
IML Drive/Type:    01/41      112344  112362  012372  7L123
                                   112343  112368  112369  7L124
DSL Information:
3290 01.02 00000000000    002222  012364  112374  8K123
3179 01.00 00000000000    112355  112365  112375  8K123
9999 01.00 00000000000    112356  002366  002376  8K123
9998 01.00 00000000000    012357  112367  112377  8K124

Location: This controller is located in Bldg 656 on the second floor.

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

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

Figure 2-49. Example of a Controller Vital Data Panel—Configuration Support B

Note: If more than 30 patches are installed on the Control disk, 8=FWD appears on this panel.

Help ##: A telephone number assigned during customization in response to question 99.

Model Number: The model number of the controller. This field is displayed only in 1TEST.

Controller ID: An identification number assigned during customization in response to question 108.

Microcode Release: This is the configuration support release and suffix level of the Control microcode on the diskette or fixed disk. B is the configuration support, 4 is the release level, and 0 is the suffix.

Maintenance Release: This is the year and Julian date that the microcode was released. 90 is the year, and 115 is the day in the year.

IML Drive/Type: This is the drive used to IML the Control disk and the type of IML that was performed:

- 01 = Diskette drive 1
- 02 = Diskette drive 2
- 03 = Fixed disk drive 1
- 04 = Fixed disk drive 2

IML Type

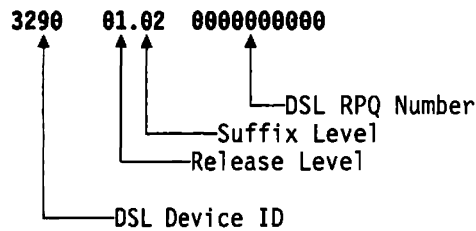
- 41 = Load production (default) operational microcode
- 42 = Load back level operational microcode
- 43 = Load trial level operational microcode.

Patches: These are the patch IDs that can be in effect for the current system configuration. Even though it appears on the panel, a patch is active only 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 denote no active RPQs.

DSL Information: This information describes one DSL device on each line. The DSL device ID comes first, followed by the release level, the suffix level for the DSL microcode, and, finally, the DSL RPQ.

The syntax for Configuration Support B is:



Location: Up to 50 characters that were entered with the update option (Test 5, Option 2,p). This field contains user-defined location information that pertains to this controller.

Configuration B/C Online Tests

Test 5, Option 1 — Configuration Support C: Displays vital data for your controller. Figure 2-50 shows an example of a controller running Configuration Support C microcode. If this test was entered from 2TEST or 3TEST, the model number and DSL information will not be shown.

```

_____ Controller Vital Data _____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:      11R                      Active
Controller ID:    1234567  Patches          RPQs
Microcode Release: C0200
Maintenance Release: 92220   123456 112361 112371 8K125
IML Drive/Type:   01/41     112344 112362 012372 7L123
                                   112343 112368 112369 7L124
DSL Information:   112345 112373 112373 8K123
3174 C02.00 92256 8Q093500 002222 012364 112374 8K123
3020 C02.00 92140           112355 112365 112375 8K123
3290 05.20 00000           112356 002366 002376 8K123
                                   012357 112367 112377 8K124

Location: This controller is located in Bldg 656 on the second floor.

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

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

Figure 2-50. Example of a Controller Vital Data Panel—Configuration Support C

Note: If more than 30 patches are installed on the Control disk, 8=FWD appears on this panel.

Help ##: A telephone number assigned during customization in response to question 99.

Model Number: The model number of the controller. This field is displayed only in 1TEST.

Controller ID: An identification number assigned during customization in response to question 108.

Microcode Release: This is the configuration support release and suffix level of the Control microcode on the diskette or fixed disk. C is the configuration support, 2 is the release level, and 0 is the suffix.

Maintenance Release: This is the year and Julian date that the microcode was released. 92 is the year, and 220 is the day in the year.

IML Drive/Type: This is the drive used to IML the Control disk and the type of IML that was performed:

- 01 = Diskette drive 1
- 02 = Diskette drive 2
- 03 = Fixed disk drive 1
- 04 = Fixed disk drive 2

IML Type

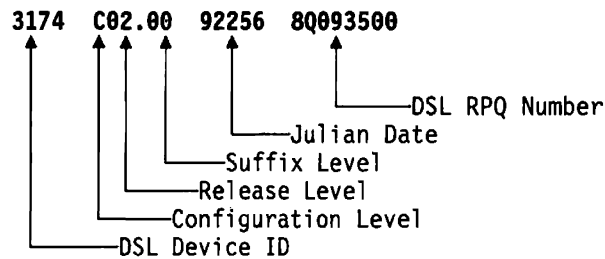
- 41 = Load production (default) operational microcode
- 42 = Load back level operational microcode
- 43 = Load trial level operational microcode.

Patches: These are the patch IDs that can be in effect for the current system configuration. Even though it appears on the panel, a patch is active only 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 denote no active RPQs.

DSL Information: This information describes one DSL device on each line. The DSL device ID comes first, followed by the configuration level, the release level, the suffix level for the DSL microcode, the Julian Date, and finally, the DSL RPQ.

The syntax for Configuration Support C is:



Note: The RPQ field is displayed only when it contains a valid RPQ number.

Location: Up to 50 characters that were entered with the update option (Test 5, Option 2,p). This field contains user-defined location information that pertains to this controller.

Configuration B/C Online Tests

Test 5, Option 2,p (p=password) — Configuration Support B: Allows you to update the location field of the Controller Vital Data. Figure 2-51 shows an example of this panel for Configuration Support B.

Note: The p is not required if the 3174 is not configured for a password in configuration question 98.

For a description of the fields shown in Figure 2-51, see “Test 5, Option 1 — Configuration Support B” on page 2-188.

```

_____ Update Controller Vital Data _____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:          11R                      Active
Controller ID:         1234567    Patches         RPQs
Microcode Release:    B0400
Maintenance Release:  90115    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  112367  112377    8K124
9998 01.00 0000000000  012357  112367  112377    8K124

Location: This controller is located Bldg 656 on the second floor.

To go directly to other tests, enter: /Test, Option

Select Test; press ENTER ==>
PF:  3=Quit  4=Save  8=Fwd  12=Test menu

```

Figure 2-51. Update Controller Vital Data Panel—Configuration Support B

Note: If more than 30 patches are installed on the Control disk, 8=FWD appears on this panel.

To update the location field, type your changes in and press PF4 to save them. See Table 2-20 for acceptable characters. Characters that are not in the table generate an invalid entry message when they are entered.

Table 2-20. Valid Characters

>	greater than	%	percent	&	ampersand
"	quote	'	apostrophe	(	left parenthesis
_	underscore	-	dash	)	right parenthesis
.	period	/	slash	:	colon
;	semicolon	?	question mark	+	plus
,	comma	<	less than	*	asterisk
A—Z	Alphabet	0—9	numbers	=	equal
a—z					

Test 5, Option 2,p (p=password) — Configuration Support C: Allows you to update the location field of the Controller Vital Data. Figure 2-52 shows an example of this panel for Configuration Support C.

Note: The p is not required if the 3174 is not configured for a password in configuration question 98.

For a description of the fields shown in Figure 2-52, see “Test 5, Option 1 — Configuration Support C” on page 2-190.

```

_____ Update Controller Vital Data _____

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

  Model Number:      11R                      Active
  Controller ID:     1234567  Patches          RPQs
  Microcode Release: C0200
  Maintenance Release: 92220    123456  112361  112371  8K125
  IML Drive/Type:    01/41      112344  112362  012372  7L123
                                   112343  112368  112369  7L124
  DSL Information:
  3174 C02.00 92256 8Q093500  002222  012364  112374  8K123
  3020 C02.00 92140          112355  112365  112375  8K123
  3290 05.20 00000          112356  002366  002376  8K123
                                   012357  112367  112377  8K124

Location: This controller is located in Bldg 656 on the second floor.

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

PF: 3=Quit    I2=Test menu
    
```

Figure 2-52. Update Controller Vital Data Panel—Configuration Support C

Note: If more than 30 patches are installed on the Control disk, 8=FWD appears on this panel.

To update the location field, type your changes in and press PF4 to save them. See Table 2-20 on page 2-192 for acceptable characters. Characters that are not in the table generate an invalid entry message when they are entered.

Test 5, Option 3,n,m: Displays port vital data for the specified port (n) and HG (m) (n=0–31, m=21–23, 26–27). Figure 2-53 shows an example of the Port Vital Data for port number 02 on hardware group 26.

If PN and HG are not specified when requesting the test, the PN and HG for the terminal you are using are displayed.

Note: HGs 21–23 and 27 are valid for 1TEST only.

Configuration B/C Online Tests

```
_____ Port Vital Data-PN 02, HG 26 _____
Device - defined          User - Defined
Device Type:             3179
Model number:            G1
Plant of manufacture:    *
Serial number:           *
Release level:           *
Engineering change data: *
                        B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
Device characteristics (hexadecimal): 03 1F 80
* = data not supplied by device
Location: Connects to port 08 on the 3174 in Bldg 656.
To go directly to other tests, enter: /Test,Option
Select Test; press ENTER ==> _
PF: 3=Quit   8=Fwd   12=Test Menu
```

Figure 2-53. Example of a Port Vital Data Panel

Note: Pressing PF8 on this panel displays the next port. If the last port of this HG is displayed on the panel, when you press PF8 the first port of the next HG is displayed. Pressing PF7 displays the previous port. If the first port of the current HG is displayed on the panel, when you press PF7 the last port of the previous HG will be displayed.

PN: The port number to which the device is connected. Valid values are 0–31 for HG 26–27 and 0–7 for HG 21–23.

HG: The Hardware Group of the attached terminal. Valid values are 21–23 (AEA) and 26–27 (TA).

Device Type: Four characters indicating the device type (such as 3179.) All characters shown in Table 2-20 on page 2-192 are valid entries. Lowercase characters will be converted to uppercase. No imbedded blanks are allowed.

Model Number: Three characters indicating the model (such as 3179 Model G1). All characters shown in Table 2-20 on page 2-192 are valid entries. Lowercase characters will be converted to uppercase. No imbedded blanks are allowed.

Plant of Manufacture: The identification of the manufacturer or the plant where the device was built (A–Z and 0–9). All characters entered in lowercase are converted to uppercase.

Serial Number: The serial number of the device.

Release Level: The release level of the microcode loaded in the device.

Engineering Change Data: This is displayed if it is supplied by the device.

Device Characteristics: Displayed if relevant to the device

Location: Up to 50 valid characters can be entered with the update option (Test 5, Option 4,n,m,p). This field contains user-defined location information which pertains to this controller.

Test 5, Option 4,n,m,p: Allows you to update the Port Vital Data for the specified port (n) and HG (m) (n=0-31, m=21-23, 26-27, p=password) The p is not required if the controller is not customized for a password in question 98. You can update information in the Device Type, Model number, Plant of Manufacture, Serial number, and Location fields.

For a description of the fields shown in Figure 2-54, see "Test 5, Option 3,n,m" on page 2-193.

Note: HGs 21-23 and 27 are valid for 1TEST only.

```

_____ Update Port Vital Data-PN 02, HG 26 _____
      Device - defined           User - defined
Device Type:                    3179
Model number:                   G1
Plant of manufacture:           *
Serial number:                  *
Release level:                  *
Engineering change data:       *

                                B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
Device characteristics (hexadecimal): 03 1F 80

* = data not supplied by device

Location: Connects to port 08 on the 3174 in Bldg 656.

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

PF: 3=Quit  4=Save  7=Back 8=Fwd 12=Test Menu
    
```

Figure 2-54. Example of an Update Port Vital Data Panel

Note: Pressing PF8 on this panel displays the next port. If the last port of this HG is displayed on the panel, when you press PF8 the first port of the next HG is displayed. Pressing PF7 displays the previous port. If the first port of the current HG is displayed on the panel, when you press PF7 the last port of the previous HG is displayed. To update this panel, type over the blank line or letters under the User - defined column, or type new information in the Location field, and press PF4 to save it. (See Table 2-20 on page 2-192 for acceptable characters to be entered in the Location field. Characters that are not in the table generate an invalid entry message when they are entered.)

Configuration B/C Online Tests

Test 5, Option 5,n,m: Displays Extended Vital Product Data for a specified port (n) and HG (m) (n=0–31, m=26–27). Figure 2-55 is displayed. If PN and HG are not specified when requesting the test, the PN and HG for the user's terminal will be displayed.

Note: HG 27 is valid for 1TEST only.

```

_____ Extended VPD - PN 05, HG 26 _____
1. Name                Howard Batts
2. Department          * Information Development
3. Location            Bldg 656 Room F306
4. Phone Number       * 444-0112 _____
5. xxxxxxxxxxxxxxxxxx * _____
6. xxxxxxxxxxxxxxxxxx * _____
7. xxxxxxxxxxxxxxxxxx * _____
8. xxxxxxxxxxxxxxxxxx * _____
```

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

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

Figure 2-55. Example of Displayed Extended Vital Product Data

Note: Pressing PF8 on this screen displays the next port. If the last port of this HG is displayed on the screen, when you press PF8 the first port of the next HG is displayed. Pressing PF7 displays the previous port. If the first port of the current HG is displayed on the screen, when you press PF7 the last port of the previous HG is displayed.

Asterisks in the Right Column: The numbered fields on the left side of the panel above are Vital Product Data labels. These fields were saved from the Extended Vital Product Data that was entered during customization. If these customized labels have been changed since the last time this test was run, the test identifies the change and puts an asterisk before the information in the right-hand column.

For example, suppose that the second item in the list to the left has been updated to Department rather than Name. Then an asterisk appears before Information Development to show the change and to alert you to check the right-hand field. Use the update option (Test 5, Option 6) if you need to make changes.

If you try to display Extended Vital Product Data for a device that does not support it, a message appears stating that the device does not support the function.

Test 5, Option 6: Allows you to update Extended Vital Product Data on the port you are using, if your terminal supports Extended Vital Product Data. Selecting this option on a terminal that does not support Extended Vital Product Data will bring up an error message. Only the fields on the right side of the panel can be changed. The panel shown in Figure 2-56 is displayed.

```

_____ Update Extended VPD _____
1. Name                      Howard Batts
2. Department                 Information Development
3. Location                   Bldg 002 Room H116
4. Phone Number              * 444-0112 _____
5. xxxxxxxxxxxxxxxxxxxxxxxx  * _____
6. xxxxxxxxxxxxxxxxxxxxxxxx  * _____
7. xxxxxxxxxxxxxxxxxxxxxxxx  * _____
8. xxxxxxxxxxxxxxxxxxxxxxxx  * _____
    
```

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

PF: 3=Quit 4=Save 12=Test Menu

Figure 2-56. Example of an Update Panel for Extended Vital Product Data

Asterisks in the Right Column: The numbered fields on the left side of the panel above are Vital Product Data labels. These fields were saved from the Extended Vital Product Data that was entered during customization. If these customized labels have been changed since the last time the test was run on this device, the test identifies the change and puts an asterisk before the information in the right-hand column.

Type in your changes in the fields to the right and enter PF4 to save them. Table 2-20 on page 2-192 contains a list of the valid characters you can put in in these fields.

Test 6 Configuration B/C: Display Control Areas

Test 6 provides five options to select from when you want to display port control information about attached devices, hosts, X.21, and X.25 control data.

To use the Display Control Areas Menu, 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**; the Display Control Areas menu is displayed.
4. Type in the option.
5. Press **Enter**.

Figure 2-57 shows an example of a Display Control Area menu.

_____ 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=21-23,26-27)
3	X.21 SHM Control Data
4,n,m	Port Control Area for Host Address n on Host ID m (n=0-254 m=1A-1H, 2A-2D, 3A-3D)
5	X.25 Control Data

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

PF: 3=Quit ; 12=Test Menu

Figure 2-57. Test 6: Display Control Areas Menu

Note: HGs 21-23 and 27 are valid from 1TEST only.

Some of the panels for options 2, 3, 4, and 5 of Test 6 are matrixes. The next screen and the description following it are used as an example to explain how to find a particular byte on these panels.

X.25 Link Control Data

	0	2	4	6	8	A	C	E
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

Figure 2-58. X.25 Link Control Data Panel Used as a Sample for Locating Bytes (partial representation)

Example

To locate particular bytes on a panel of this type, for example bytes 24 and 25, do the following:

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.

Test 6, Option 1: This option is reserved for support personnel. Figure 2-59 shows the panel for this option.

Display Register Pages

Register Page xx	Register Page xx
00: xxxx xxxx	16: xxxx xxxx
02: xxxx xxxx	18: xxxx xxxx
04: xxxx xxxx	20: xxxx xxxx
06: xxxx xxxx	22: xxxx xxxx
08: xxxx xxxx	24: xxxx xxxx
10: xxxx xxxx	26: xxxx xxxx
12: xxxx xxxx	28: xxxx xxxx
14: xxxx xxxx	30: xxxx xxxx

To go directly to other tests, enter: /Test,Option
 Select test; press ENTER ==> _
 PF: 3=Quit 8=Fwd 12=Test Menu

Figure 2-59. Example of a Display Register Pages Panel

Configuration B/C Online Tests

Test 6, Options 2 and 2,n,m: Displays Port Control Area, ASCII Port Control Area, and LT Control Area information, and LTE panels for devices attached to Terminal Adapter (HG 26 or 27) or AEA (HG 21, 22, 23) ports. The types of panels displayed depend on the attached device type, how the port was configured, and which test mode is running (1TEST, 2TEST, 3TEST). Use Table 2-21 to help you understand the panel sequences you may see.

Table 2-21. Device and Control Area Information

Device	MLT	Port Control Area Panel/Segments	ASCII Port Control Area Panel	Logical Terminal Control Area Panels/Segments	LTE Panels
CUT	No	3 segments (00–02)	No	4 segments (00–03)	No
CUT	Yes	3 segments (00–02)	No	4 segments per session (00–03)	No
DFT	N/A	3 segments (00–02)	No	4 segments (00–03)	Yes
DFTE	N/A	3 segments (00–02)	No	2 panels of 4 segments each	Yes
ASCII Terminal	No	3 segments (00–02)	Yes	4 segments (00–03)	No
ASCII Terminal	Yes	3 segments (00–02)	Yes	4 segments per session (00–03)	No
ASCII Host	No	3 segments (00–02)	Yes	4 segments (00–03)	No
Printer	Yes	3 segments (00–02)	No	4 segments (00–03)	No
ASCII Printer	Yes	3 segments (00–02)	Yes	4 segments (00–03)	No

Note: Port Control Area segment 3 (02) applies to 1TEST only.

Figure 2-60 on page 2-201 shows Port Control Area information about the terminal from which Test 6, Option 2 was invoked or selected. If you selected Option 2,n,m instead, the information displayed would pertain to the specified port number and hardware group.

Use the example on page 2-199 for help identifying particular bytes on this panel.

_____ Port 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	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 2-60. Example of a Port Control Area Panel

Where

- mm - Segment number of the current panel.
- PN - Port number (0-31) of the port you are using or the port selected
- HG - Hardware group (21-23 and 26-27) of the device you are using or the device selected.

To analyze the information contained in Port Control area segment 00, see "Port Control Area Bit Definitions" on page 2-204. Segments 01 and 02, displayed by pressing PF8, are reserved for support personnel. After segment 02 is displayed, press PF8. One of the following panels appears:

- ASCII Panel Control Area—reserved for support personnel.
 Press PF8 to display the LT Control Area.
- LT Control Area—see Figure 2-61 on page 2-202.

Figure 2-61 on page 2-202 shows LT Control Area information for the logical terminal specified by the parameter values.

Configuration B/C Online Tests

_____ LT x 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

Figure 2-61. Example of an LT Control Area Panel

Where

- x = 1–5, LT session number of the MLT device for which the data on the panel applies. LT x does not appear on the panel if this is a non-MLT device.
- mm = Segment number of the current panel.
- PN = Port number (0–31) of the port you are using or the port selected
- HG = Hardware group (21–23 and 26–27) of the device you are using or the device selected.
- IDn = The host session identifier and port assignment entry number for the port on this host's Port Assignment Specification Table.

To analyze the information contained in segment 00 for each LT, see “LT Control Area Bit Definitions” on page 2-206. Segments 01, 02, and 03 are reserved for support personnel.

Four segments (00–03) can be displayed for each logical terminal (LT) configured for the port you are checking. The bit definitions for each segment 00 panel are explained in “LT Control Area Bit Definitions” on page 2-206.

For DFT and DFTEs, press PF8 after the last LT Control Area panel to display the LTE Control Area panel. See Figure 2-62 on page 2-203.

The panel shown in Figure 2-62 on page 2-203 is an example of an LTE control area panel in 1TEST. The information it contains is reserved for support personnel.

The panel shown in Figure 2-63 on page 2-203 is an example of an LTE control area panel in 2TEST.

```

          _____ LT Control Area - PN 12, HG 26 _____

LTE 01 1A2

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

LTE 02 2A2 See LTE on 2TEST for most current information

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

LTE 03 1C5

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

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

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

```

Figure 2-62. Example of an LTE Control Area Panel in 1TEST

```

          _____ LT Control Area - PN 12, HG 26 _____

LTE 2A1

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

LTE 2A2

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

LTE 2A3 See LTE on 1TEST for most current information

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

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

PF: 3=Quit 7=Back 8=Fwd 12=Test Menu

```

Figure 2-63. Example of an LTE Control Area Panel in 2TEST

Configuration B/C Online Tests

LTE: The LTE has two fields. The first field contains two characters ranging from 01–05. These characters represent the particular LT associated with the LTE and only appear in 1TEST. The second field consists of 3 characters representing the host session identifier. The first two characters, ranging from 1A–1H, 2A–2D, or 3A–3D, identify the host. The third character is the port assignment entry number assigned to this port for the host ID being used for the session.

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 1 unless otherwise noted.

Table 2-22 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning
Byte 04	0,1	Reserved
	2	Op Complete pending from device
	3	Selector Pen retry processing
	4–6	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	DFTE device
	5	3174 Peer device
	6	Display with attached printer
7	Reserved	
Byte 08	0	0 = 3278 mode 1 = Native mode
	1	0 = No numeric lock 1 = Numeric lock
	2	0 = No modifiable keyboard- Keyboard functions have not been redefined. 1 = Keyboard functions have 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 00100 Reserved D through 11111

¹ Actual features identified to the 3174 by the terminal.

Table 2-22 (Page 1 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning	
Byte 09 ¹ (Display)	0–3	0000 = Reserved 0001 = APL keyboard/numeric lock 0010 = Text keyboard/numeric lock 0011 = RPQ (8K1038) typewriter keyboard 0100 = Typewriter Attribute Select keyboard 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 keyboard 1111 = No keyboard	
	4–6	010 = Model 2 (24 rows) 011 = Model 3 (32 rows) 101 = (30 rows) 110 = Model 5 111 = Model 4	
	7	0 = Shows display byte 1 = Shows 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 with attached printer
5–7		Reserved	

¹ Actual features identified to the 3174 by the terminal.

Table 2-22 (Page 2 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning	
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	
Byte 3C		2NN (Machine Check Number)	
Byte 3D		3NN (Machine Check Number)	
Byte 3F	0-2	Reserved	
	3	Device power switched 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 disabled	
	6	Reserved	
	7	Display CECF capable	
	Byte 75	0	Reserved
		1	Multiple display sessions on display
2		Equipment Check	
3-7		Reserved	
Byte 77	0	Buffered local copy print	
	1	Printer disabled	
	2	Printer busy processing abort or SSA	
	3	Reserved	
	4	Reserved	
	5	Shared Mode Printer	
	6	Local Mode Printer	
	7	System Mode Printer	

¹ Actual features identified to the 3174 by the terminal.

Configuration B/C Online Tests

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. Bits are assumed to be set to 1 unless otherwise noted. Bytes 04 and 06 show functions supported by the controller and reported as available by the device.

Table 2-23 (Page 1 of 2). LT Control Area Bit Definitions

Location	Bit	Meaning
Byte 04	0–2	Value Model Buffer Size
		010 2 1920 (1920)
		011 3 2560 (1920)
		101 - 2400 (1920)
		110 5 3564 (1920)
	111 4 3440 (1920)	
	3,4	00 = Typewriter Display
		01 = Data Entry Display
		10 = None of the others
		11 = Printer
5	Keyboard present	
6	SOEMI printer present	
7	Numeric lock feature present	
Byte 05	0	Katakana keyboard attached
	1	SCS feature installed on printer
	2	Text keyboard
	3	3289 text feature
	4	APL keyboard
	5	Attribute select keyboard
	6	Printer supports extended LU1 data stream with SNA FM headers
7	DFT session	
Byte 06	0	Reserved
	1	Security keylock present
	2	Selector pen attached
	3	Reserved
	4	MSR/MHS attached
	5	Reserved
	6	Extended function feature present
7	ECS feature present	
Byte 07 ¹	0–2	Reserved
	3	Color
	4	Display with attached printer
	5–7	Reserved
Byte 08	1	LT connection active
Byte 33		Printer buffer size
		08 = 2K
		10 = 4K
		20 = 8K
Byte 36	0	Printer allocated to local copy
	1	Local copy printer allocated to host
	2	Host request for local copy allocated printer
	3	Alternate row length
	4	Default row length indicator
	5	Local copy pending
	6	SNA – LU in ERP state
7	SNA – Host communication disabled (LU active)	

¹ Features supported and reported as available by the device associated with the LT Control Area.

Table 2-23 (Page 1 of 2). LT Control Area Bit Definitions

Location	Bit	Meaning
Byte 3E		4NN (Program Check Number)
Byte 3F		5NN (Communication Check Number)
Byte 4C	0	Device attached to CU via AEA adapter
Byte 68	0	Printer equipment check/display disabled error
	1	Intervention required
	2	Reserved
	3	Reserved
	4	Print in process
	5	Start printing pending
	6	Reserved
7	Reserved	
Byte A0		WCC save area
Byte AE	0	Reserved
	1	Device is bound
	2	Start data traffic (DFT - pending bind response)
	3	Outbound pacing indicator (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)

¹ Features supported and reported as available by the device associated with the LT Control Area.

Table 2-23 (Page 2 of 2). LT Control Area Bit Definitions

Location	Bit	Meaning
Byte AF	0-3	Bracket state FSM
		0000 = Between 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	4	1111 = In brackets
		0 = Send between chain
		1 = Send in chain
5,6	5,6	Chain receive
		00 = Receive between chain
		01 = Receive in chain
7	7	11 = Receive purging chain
		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		LU type bound (01,02,03)
Byte B6		Printer outbound pacing count
Bytes DC,DD		Default screen size
Bytes DE,DF		Alternate screen size
Byte F3	0	LT trace enabled
Byte F7	2	Greek Base keyboard attached

¹ Features supported and reported as available by the device associated with the LT Control Area.

Configuration B/C Online Tests

Test 6, Option 3 (X.21): Displays the host control data on controllers that are configured for X.21. Figure 2-64 shows an example of an X.21 Short-Hold Mode panel.

Note: This option shows only 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.

Use the example on page 2-199 for help identifying particular bytes on this panel.

X.21 SHM Control Data								
	0	2	4	6	8	A	C	E
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 2-64. Example of an X.21 Short-Hold Mode Host Control Data Panel

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 shows 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 2-24 on page 2-209 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-64.

Table 2-24. X.21 XID Summary

Location	Bit	Meaning	
Byte 00 ¹		Format of XID I-field and PU type	
	0-3	Format of XID I-field. 0 = Fixed format; Bytes 00-05 are used 1 = Variable format; Bytes 00-P are used	
		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	0-11 Node identification
12-31 The product block number			
32-47 The SDLC ID			
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 PIUs are forwarded unchanged 01 = Segments are assembled on a link station basis 10 = Segments are assembled on a session basis 11 = Only complete BIUs are allowed	

¹ Byte 0 = 12 for 3174 variable format XIDs

² Bytes 2-7 = 017nnnnxxxx where 017 = 3174 block number, nnnn = 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 2-24. X.21 XID Summary

Location	Bit	Meaning
Byte 09 (cont)	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
	Bytes 10, 11	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	SDLC 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
Byte 18		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, nnnn = 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.

Configuration B/C Online Tests

Test 6, Option 4,n,m: Displays the Port Control Area for a selected host address on a specific host ID (n=0–254, m=1A–1H, 2A–2D, 3A–3D). Only one of each potential type of control block is displayed, regardless of the number of LTs.

Notes:

- 1A to 1H identifies from one to eight hosts that can be configured for the token-ring adapter, the Enterprise Systems Connection Adapter, or through a Type 1 or Type 2 Communication Adapter on an X.25 network. See the *3174 Planning Guide* for details.
- 2A–2D or 3A–3D identifies a host connection through a Concurrent Communication Adapter.

Figure 2-65 on page 2-210 shows the Port Control Area information for a specific host address and host ID.

Use the example on page 2-199 for help identifying the particular bytes on this panel.

_____ Port Control Area - HA 002, ID 1A _____

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 7=Back 8=Fwd 12=Test Menu

Figure 2-65. Example of a Port Control Area Panel for Specified Host

To analyze the information contained in Port Control area segment 00, see “Port Control Area Bit Definitions” on page 2-204. Segments 01 and 02, displayed by pressing PF8, are reserved for support personnel. After segment 02 is displayed, press PF8. One of the following panels appears:

- ASCII Panel Control Area—reserved for support personnel
- LT Control Area—see Figure 2-61 on page 2-202.

Following these panels, the LTE control area panel appears for DFT and DFTEs by pressing PF8.

See Table 2-21 on page 2-200 to determine which control area panels appear. Note that only one control area (with multiple segments) appears for each type.

Test 6, Option 5 (X.25): Displays the X.25 Link Control Data shown in Figure 2-66 on page 2-211 and the Host Control Data shown in Figure 2-67 on page 2-212.

Use the example on page 2-199 for help identifying the particular bytes on this panel.

X.25 Link Control Data								
	0	2	4	6	8	A	C	E
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		
50								
60								
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 8=Fwd 12=Test menu

Figure 2-66. Example of an X.25 Link Control Data Panel

Where

- iiii = Reserved
- xxxx = 2-byte link counter
- xaxb = 2-byte link counter used in the example below
- rrrr = Reserved

The bytes are described in "Link Counters (X.25 Link Control Data)."

Link Counters (X.25 Link Control Data)

- 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.

Configuration B/C Online Tests

- 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 the 3174. This is an internal-exception condition and is retried by the 3174.
- Bytes 3C, 3D The number of receive buffer overruns detected by the 3174. 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 The number of receive timeouts detected by the 3174.
- Bytes 48, 49 The number of call attempts counted by the 3174.
- Bytes 4A, 4B The number of call completions.

The host control data shown in Figure 2-67 reflects only those hosts for which IDs were configured. If a host ID has not been configured or included for IML during customization, control data for that host does not appear on the panel.

	X.25 Host Control Data								
	0	2	4	6	8	A	C	E	
Host 1A	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1B	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1C	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1D	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1E	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1F	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1G	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	
Host 1H	0011	2233	4455	6677	0000	AABB	CCDD	EEFF	

To go directly to other tests, enter: /Test,Option
 Select Test; press ENTER ==> _
 PF: 3=Quit 7=Back 12=Test menu _

Figure 2-67. Example of an X.25 Host Control Data Panel

Note: The preceding figure shows eight hosts (1A–1H) on a primary link (1TEST). For host IDs on a secondary link (2TEST and 3TEST), you can have up to 4 hosts (2A–2D or 3A–3D). “Circuit Counters (X.25 Host Control Data)” on page 2-213 describes the circuit counter bytes.

Circuit Counters (X.25 Host Control Data)

- Bytes 00, 01 The number of Data packets sent by the 3174.
- Bytes 02, 03 The number of Data packets received by the 3174.
- Bytes 04, 05 The number of Receiver Ready packets sent by the 3174.
- Bytes 06, 07 The number of Receiver Ready packets received by the 3174.
- Bytes 0A, 0B The number of Receiver Not Ready packets sent by the 3174.
- Bytes 0C, 0D The number of Interrupt packets sent by the 3174.
- Bytes 0E, 0F The number of Interrupt packets received by the 3174.

Test 7 Configuration B/C: Color Convergence

This test is available only from 1TEST. Test 7 does 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/C: Extended Functions and Programmed Symbols

Test 8 checks the programmed symbols (PS) and color for any device that uses PS or color. For a description of this procedure, see the appropriate display station problem determination manual.

Test 9 Configuration B/C: Token-Ring and LAN Tests

- | This test is available only from 1TEST.
- | Test 9 in Configuration B provides a test facility to check the status of the token ring, the token-ring adapter, and attached links. Test 9 in Configuration C provides a test facility to check the status of LANs (token ring or Ethernet), LAN adapters, and attached links and to reopen a LAN adapter.
- | Also in Configuration C, Option 9 provides test of the 3174-Peer connection.

To select one of the test options from the 3174 Test Menu, perform the following at any 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/9**
3. Press **Enter**; a LAN Test or Token-Ring Test menu displays.
4. Type in the option number.
5. Press **Enter**.

Note: Test 9,1 can be performed only from one terminal at a time.

- | Test 9 has two different test menus. The one you see depends on the microcode level you are using.
- | Figure 2-68 on page 2-214 shows the test menu and options you get with Configuration Support B microcode. Figure 2-69 on page 2-214 shows the test menu and options you get with Configuration Support C.

Configuration B/C Online Tests

```
_____ Token-Ring Test Menu _____
```

Option	Description
1	Monitor token-ring status
2	Display token-ring adapter status summary
3	Reset token-ring adapter status counters
4	Display link status summary for all links
5,*	Display link status summary
6	Reset link status counters for all links
7,*	Reset link status counters
8	Display Gateway host status summary for all links
8,h	Display host status summary for all host id h

* = n or h or h,n where n=link address h=host ID

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

PF: 3=Quit 12=Test menu

Figure 2-68. Test 9: Token-Ring Test Menu

```
|  
|  
|_____ LAN Test Menu _____  
|  
| Option      Description  
|  
| 1           Monitor LAN status  
| 2           Display LAN adapter status summary  
| 3           Reset LAN adapter status counters  
| 4           Display link status summary for all links  
| 5,*         Display link status summary  
| 6           Reset link status counters for all links  
| 7,*         Reset link status counters  
| 8           Display Gateway host status summary for all links  
| 8,h         Display host status summary for all host id h  
| 9,u         3174-Peer status (u=update)  
| 10,u        3174-Peer bridge profile (u=update)  
| 11          3174-Peer bridge status  
| 12,u        LAN Manager profile (u=update)  
| 13          Reopen LAN adapter  
| * = n or h or h,n where n=link address h=host ID  
|  
| To go directly to other tests, enter: /Test,Option  
| Select Option; press ENTER ==> _  
|  
| PF: 3=Quit 12=Test menu  
|
```

Figure 2-69. Test 9: LAN Test Menu

Note: In the following test option descriptions, the LAN is synonymous with token-ring unless an exception is specified.

- | **Test 9, Option 1:** Displays LAN adapter status summary. Figure 2-71 on page 2-216 shows the Monitor LAN Status panel displayed in Configuration Support C.
- | See 3174 *Status Codes* for descriptions and recommended action for the status codes displayed on the following Token-Ring Status panel or the Monitor LAN Status panel.
- | **Note:** Not all the messages shown in these examples appear at the same time.

_____ Token-Ring Status _____

4697 - Local Token-Ring Adapter closed

4691 - Signal Loss (Adapter not detecting ring signal)

4692 - Hard Error (Adapter detecting a beacon condition)
either internally or receiving a Beacon MAC frame)

4693 - Wire Fault (Adapter has detected a wire fault
and de-inserts)

4694 - The test has been active for 00000 minutes.

4695 - The test will terminate in n minutes
Press PF9 to continue for another 10 minutes.

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

PF: 3=Quit 9=Cont 12=Test menu

- | *Figure 2-70. Token-Ring Status Panel*

Configuration B/C Online Tests

```
|
|           _____ Monitor LAN Status _____
|
| 4739 - Local LAN adapter is Ethernet
|
| 4697 - Local LAN adapter closed
|
| 4741 - Media error - Transceiver not working?
|           Cable fault?
|           Cable disconnected?
|           Hub not connected?
|
| 4742 - AUI 12-Volt Overcurrent Error - replace AUI cable
|
| 4740 - Adapter Check - service Ethernet Adapter
|
| 4694 - The test has been active for 00000 minutes.
|
| 4695 - The test will terminate in n minutes
|           Press PF9 to continue for another 10 minutes.
|
| To go directly to other tests, enter: /Test,Option
| Select option; press ENTER ==> _
|
| PF: 3=Quit 9=Cont 12=Test menu
|
```

| *Figure 2-71. Monitor LAN Status Panel*

Test 9, Option 2 (Token-Ring): Displays Token-Ring adapter status summary. Figure 2-72 shows an example of the LAN Adapter Status Summary panel when a Token-Ring adapter is installed.

```

_____ Token-Ring Adapter Status Summary _____
Adapter Address - 40000000000104   Adapter Status - Open
Customized Links - 010             Active Links - 005

                                Counters      Overflow

Line Errors                    00000000      0
Internal Errors                00000000      0
Burst Errors                   00000000      0
ARI/FCI Errors                 00000000      0
Abort Delimiters               00000000      0
Lost Frames                    00000000      0
Receive Congestion             00000002      0
Frame Copied Errors            00000000      0
Frequency Errors               00000000      0
Token Errors                   00000000      0

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

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

Figure 2-72. Example of a Token-Ring Adapter Status Summary Panel

Adapter Address: This is the 6-byte token-ring address of the token-ring adapter set up when the controller was configured, followed by a 1-byte service access point address (SAP).

Adapter Status: This shows the token-ring adapter's physical state relative to the token-ring (opened or closed).

Customized Links: The number of links identified during configuration of the Control disk. Customized APPN 2.1 links are included. The number of configured links and host address range can reflect downgraded values differing from the original configuration. (Run /2,2 to see the original values.)

Active Links: The number of active links at the time the test request was entered. Active APPN 2.1 links, both customized and dynamic, are included.

Line errors: This counter is increased when a frame is copied or repeated by the protocol handler, the error detect indicator is zero, and one of the following conditions exists:

- A code violation exists between the starting delimiter and the ending delimiter of a frame.
- A code violation exists in a free token.
- A frame check sequence error is a format type-1 frame.

Configuration B/C Online Tests

Internal errors: This counter is increased when the controller recognizes an internal token-ring adapter error. These errors show the token-ring adapter is in a marginal operating condition.

Burst errors: This counter shows the number of burst interrupts from the protocol handler. The burst error counter shows the number of frames that are in error because of noise on the ring.

Address Recognized Indicator/Frame Copied Indicator (ARI/FCI): This counter is increased when the token-ring adapter receives a returned frame with the address recognized bit and/or the frame copied bit not set. This error is caused by the receiving station having no buffers available, or a wrong address received (line hit), or the ARI/FCI bits could not be set.

Abort Delimiters: This counter is increased when the token-ring adapter transmits an abort delimiter. This occurs with internal token-ring adapter errors.

Lost Frames: This counter is increased when the token-ring adapter is in transmit mode and fails to receive the frame it transmitted.

Receive Congestion: This counter is increased when the token-ring adapter is busy and recognizes a frame addressed to it, but cannot receive the frame because of insufficient buffer space.

Frame Copied Errors: This counter is incremented when the token-ring adapter detects a frame with its own address and the ARI or FCI bit is set on. This shows that another device or controller might be attached to the ring that has a duplicate address.

Frequency Errors: This counter is increased when the token-ring adapter detects an excessive difference between the ring data frequency and the token-ring adapter's frequency oscillator.

Token Errors: This counter is increased when the active monitor function detects an error with the token protocol. These errors show another device or controller is not following normal token protocols.

| **Test 9, Option 2 (Ethernet):** Displays LAN adapter status summary. Figure 2-73 shows an
 | example of the LAN Adapter Status Summary panel when an Ethernet Adapter is installed.

```
|
|           _____ Ethernet Adapter Status Summary _____
|
| Address - 40000000000001 (Open ) Links: Customized - 015 Active - 014
|
|           Counters           Overflow
| Alignment errors             00000000           0
| FCS errors                   00000000           0
| Single Collision Frames      00000005           0
| Multiple Collision Frames    00000001           0
| SQE Test errors              00000000           0
| Late Collisions              00000000           0
| Internal MAC Transmit Errors 00000000           0
| Carrier Sense Errors         00000002           0
| Excessive Deferrals          00000000           0
| Frames too long              00000000           0
| Frames too short             00000000           0
| Internal MAC receive errors  00000000           0
|
| To go directly to other tests, enter: /Test,Option
| Select option; press ENTER ==> _
|
| PF: 3=Quit 12=Test menu
|
```

| *Figure 2-73. Example of an Ethernet Adapter Status Summary Panel*

| **Address:** This is the 6-byte LAN address of the Ethernet Adapter specified during 3174 configuration,
 | followed by a 1-byte service access point (SAP) address.

| **Adapter Status:** This shows the Ethernet Adapter's physical state relative to the LAN (opened or
 | closed).

| **Customized Links:** The number of links identified during configuration of the Control disk. Customized
 | APPN 2.1 links are included. The number of configured links and the host address range can reflect
 | downgraded values that differ from the original configuration. (Run /2,2 to see the original values.)

| **Active Links:** The number of active links at the time the test request was entered. Active APPN 2.1
 | links, both customized and dynamic, are included.

| **Alignment errors:** The frames received that are not an integral number of octets in length and do not
 | pass the FCS check.

| **FCS errors:** The frames received that are an integral number of octets in length but do not pass the FCS
 | check.

| **Single Collision Frames:** The successfully transmitted frames for which transmission is inhibited by one
 | collision.

| **Multiple Collision Frames:** The successfully transmitted frames for which transmission is inhibited by
 | more than one collision.

| **SQE Test Errors:** The number of times that the SQE TEST ERROR message is generated.

Configuration B/C Online Tests

- | **Deferred Transmissions:** The frames for which the first transmission attempt is delayed because the medium is busy.
- | **Late Collisions:** The number of times that a collision is detected later than 512 bit times into the transmission of a packet.
- | **Internal MAC Transmit Errors:** The frames for which transmission fails because of an internal MAC sublayer transmit error.
- | **Carrier Sense Errors:** The number of times the carrier sense condition was lost or never asserted when attempting to transmit a frame.
- | **Excessive deferrals:** The number of frames for which transmission on a particular interface fails because of excessive collisions.
- | **Frames too long:** The frames received that exceed the maximum permitted frame size.
- | **Frames too short:** The number of frames received on a particular interface that did not contain the minimum number of bytes.
- | **Internal MAC receive errors:** The frames for which reception fails because of an internal MAC sublayer receive error.

Test 9, Option 3: Resets all the counters displayed when using Option 2.

- Test 9, Options 4 and 5:** Display the link status counters for all links (/9,4) or for the six links starting with the link selected in the test request (/9,5). A 7-byte link address is required for this test. The address is a 6-byte LAN adapter address followed by the 1-byte link station service access point (SAP) address. Figure 2-74 on page 2-221 and Figure 2-75 on page 2-221 show examples of the Link Status Summary panel.


```

_____ Link Status Summary Host ID=XX _____

Link Address      40000000000204  40000000000304  40000000000404
Primary/Secondary    01/02          01/02          01/02
Trans I-Frames      00000001 - 0    00000011 - 0    00000111 - 0
Rec I-Frames        00000002 - 0    00000022 - 0    00000222 - 0
Transmit Errors     00000003 - 0    00000033 - 0    00000333 - 0
Received Errors     00000004 - 0    00000044 - 0    00000444 - 0
T1 Expired          00000005 - 0    00000055 - 0    00000555 - 0
Com/Res Ind, Format  83 1B 802.5    83 1B 802.5    83 1B 802.5

Link Address      40000000000604  40000000000704  40000000000804
Primary/Secondary    01/02          01/02          01/02
Trans I-Frames      00000007 - 0    00000077 - 0    00000777 - 0
Rec I-Frames        00000008 - 0    00000088 - 0    00000888 - 0
Transmit Errors     00000009 - 0    00000099 - 0    00000999 - 0
Received Errors     00000010 - 0    00000100 - 0    00001000 - 0
T1 Expired          00000012 - 0    00000120 - 0    00001200 - 0
Com/Res Ind, Format  83 1B 802.5    83 1B 802.5    83 1B 802.5

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

PF: 3=Quit  7=Back  8=FWD  12=Test menu
    
```

Note: The panel shown is for microcode level C release 4.0 and higher.

Figure 2-74. Example of a Link Status Summary Panel for a 3174 Token-Ring Gateway

```

_____ Link Status Summary _____

Host ID/LSAP/Link Address  1A 04 400000000000104  1C 08 400000000000104
Primary/Secondary          01/02          01/02
Trans I-Frames             00000001 - 0    00000011 - 0
Rec I-Frames               00000002 - 0    00000022 - 0
Transmit Errors            00000003 - 0    00000033 - 0
Received Errors           00000004 - 0    00000044 - 0
T1 Expired                 00000005 - 0    00000055 - 0
Com/Res Ind, Format        83 1B 802.3    83 1B 802.3

LSAP/Link Address         04 400000000000204  04 4000000000002104
Primary/Secondary          01/02          01/02
Trans I-Frames             00000111 - 0    00001111 - 0
Rec I-Frames               00000222 - 0    00002222 - 0
Transmit Errors            00000333 - 0    00003333 - 0
Received Errors           00000444 - 0    00004444 - 0
T1 Expired                 00000555 - 0    00005555 - 0
Com/Res Ind, Format        83 1B 802.3    83 1B 802.3

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

PF: 3=Quit    7=Back    8=FWD    12=Test menu
    
```

Figure 2-75. Example of a Link Status Summary Panel

Configuration B/C Online Tests

Figure 2-74 shows an example of the Link Status Summary for a token-ring gateway controller, for example, a Model 23R. Figure 2-75 shows an example of the Link Status Summary for a controller, for example, a Model 24R, attached to an Ethernet network. The controller attached to the Ethernet network is also serving as an advanced peer-to-peer network (APPN) node for some end nodes, using PU type 2.1. The Host ID is not shown for the links to the end nodes because the network node accesses the APPN network, not a particular host.

Host ID: The host ID for the host (possible values are 1A–1H, 2A–2H, and 3A–3H).

LSAP: Local Service Access Point: the service access point (SAP) associated with this token-ring adapter.

Link Address: This is the station address assigned to each link during configuration. This address is the 6-byte token-ring adapter address followed by the 1-byte service access point (SAP) address.

Trans I-Frames: This counter shows the number of Information format logical link control protocol data units (LPDUs) that have been sent, including all retransmissions. The actual counter for the link is reset when there is an overflow of any counter, or whenever the link is initialized.

Rec I-Frames: This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors: This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Received Errors: This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired: This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

Com/Res Ind: The first two-digit hexadecimal value shows the last command/response received. The second two-digit hexadecimal value shows the last command/response sent.

Format: The following values are valid for this field:

- 802.3 Ethernet with 802.3 frame formats
- V2 Ethernet with V2 frame formats
- 802.5 Token-Ring with 802.5 frame formats

Note: This field is displayed for microcode level C release 4.0 and higher only.

Primary/Secondary: These are the DLC primary and secondary states for the link station:

Primary State	Secondary State
80 Link Closed	80 Checkpointing
40 Disconnected	40 Local busy (operator)
20 Disconnecting	20 Local Busy (buffer)
10 Link Opening	10 Remote Busy
08 Resetting	08 Rejection
04 Frame Reject Sent	04 Clearing Algorithm Running
02 Frame Reject Received	02 Dynamic Window
01 Link Opened	01 Reserved

Note: The primary states are mutually exclusive. The secondary states are not mutually exclusive.

Primary States

80 - Link Closed: The link closed state is entered in the following cases:

- A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission completes when the transmission completes.
- A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.
- A Reset command has been received, but a transmission has already been queued to the hardware, or an ARB request or SSB response has been queued to the controller and must complete before the link station control block can be released.

No commands are accepted while the token-ring adapter is in the link closed state. All received frames are ignored.

40 - Disconnected: The disconnected state is entered in the following cases:

- Acceptance of an Open Station SRB
- Acceptance of a SABME for a previously nonexistent station
- Receipt of a DISC command or a DM response from the paired station
- When the retry count has been exhausted because of time-outs.

In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

The following SRBs are accepted:

Close station SRB - Transition to link closed.
Connect station SRB - Transition to link opening.

20 - Disconnecting: The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state can also be entered on expiration of the retry count in FRMR received. This state is maintained until one of the following occurs:

- Either a UA or DM response is received to the transmitted DISC command.
- A SABME command is received and a DM response has been transmitted.
- The retry count expires.

There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting state is to the disconnected state. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The token-ring adapter exits this state to the link is nonexistent or the link is closed. Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

10 - Link Opening: The token-ring adapter enters the link opening state when the controller accepts a Connect station SRB.

08 - Resetting: The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The token-ring adapter reports receipt of the SABME command to the controller using a DLC Status ARB indicating a SABME command and the Station ID of the affected station was received. In this state, the token-ring adapter accepts the following SRBs:

Configuration B/C Online Tests

Close Station SRB - Transition to the disconnecting state.
Connect Station SRB - Transition to the link opening state.

All incoming frames are ignored except:

DISC - Transmit UA, transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to FRMR received.
SABME - The token-ring adapter informs the controller.

04 - Frame Reject Sent: When the token-ring adapter transmits a Frame Reject (FRMR) because it receives an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

In this state, the token-ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

All incoming frames except the following are ignored except that FRMR response final is transmitted in response to command polls:

SABME - Transition to the resetting state.
DISC - Transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to the FRMR received state.

02 - Frame Reject Received: When the token-ring adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The token-ring adapter then enters the FRMR received state.

In this state, the token-ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

In this state, all frames except the following are ignored:

SABME - Transition to the resetting state.
DISC - Transition to the disconnected state.
DM - Transition to the disconnected state.

01 - Link Opened: The link opened state is entered from link opening after the SABME-UA exchange that completes the connection protocol. This is the only state where information transfer is allowed and where transmit SRBs are accepted. In this state, the token-ring adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

If the primary state is changed from link opened because of receipt of a frame such as SABME or FRMR, or because the retry count has been exhausted, any outstanding Transmit requests are returned to the controller by using a single Transmit SSB. If the primary state is changed because of a user command such as Close station, outstanding Transmit requests are not returned.

Secondary States

80 - Checkpointing: A poll is outstanding. I-frame transmission is suspended.

40 - Local Busy (User): A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.

20 - Local Busy (buffer): An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.

10 - Remote Busy: An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.

08 - Rejection: An out of sequence I-frame has been received and an REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.

04 - Clearing: A poll is outstanding and a confirmation of clearing Local Busy is required after the response is received.

02 - Dynamic Window: A remote station on another ring is connected through a bridge to the local ring and, there appears to be congestion through the bridges.

Test 9, Option 6: Resets the link status counters for all links.

Test 9, Option 7: Resets the link status counters for the link selected in the test request.

Test 9, Option 8: Displays the number of customized links and host address ranges. For each customized link, the host address, the host link status, and the LAN address are displayed. The number of configured links and host address range can reflect downgraded values differing from the original configuration. (Run /2,2 to see the original values.) See Figure 2-76 on page 2-226 for an example of the gateway Host Status Summary panel.

Note: Option 8 is available only on those controllers having the gateway feature.

Configuration B/C Online Tests

Gateway Host Status Summary

Customized Links -			XXX	Address Range -			XX-XX
Host Address	Link Status	LAN Address	Host Address	Link Status	LAN Address		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		
XX	XX	XXXXXXXXXXXXXX	XX	XX	XXXXXXXXXXXXXX		

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

PF: 3=Quit 7=Back 8=Fwd 12=Test menu

Figure 2-76. Example of a Gateway Host Status Summary Panel

The Gateway Host Status Summary panel shows information on the links and addresses, and the status of the links.

Customized Links: The number of links declared at customizing time if storage was available to support them or the maximum number of links possible in the storage available (this field shows the actual working configuration). This field reflects the links for the customized PUs.

Address Range: The host address range declared in customizing. This field shows the actual working addresses. This field is not displayed for frame relay.

Host Address: The address assigned each link during customizing. For frame relay, this is the DLCI and SAP pair.

Link Status: The 2-digit status code representing the status of the link:

For Local Gateway Models (xL or xxL):

- 00 = The token-ring attached physical unit is in disconnect mode
- 02 = The token-ring attached physical unit is connected.

For Remote Gateway Models (xR or xxR):

- 00 = SNRM required
- 01 = SNRM received
- 02 = Connected/active
- 03 = Poll timeout.

For frame relay

- 00 = Not active
- 02 = Connected/active

- LAN Address:** The station address assigned to each link during customizing. This address is the 6-byte LAN adapter address followed by the 1-byte service access point (SAP) address.

Test 9, Option 9,u (u=update): Displays address and status information about the 3174-Peer devices and can be run either in display mode or in update mode. To invoke the test in display mode, do not enter the **u**; enter the **u** for update mode. If you invoke the test in update mode, you will be prompted for the password that was set up in configuration question 98. You must have this password to enter update mode. Figure 2-77 shows an example of the Update 3174-Peer Status panel.

Update 3174-Peer Status - HG 26												
Port	Current Address			Functional Address			Group Address			Discarded Frame Ctr	Device Status	Action
00	4000	3174	2600	C000	0000	0080	....	....	....	5,232	1	-
01	4000	3174	2601	....	....	....	....	....	....	0	1	-
02	4000	B660	C201	C000	0000	0080	C000	8001	0000	15	1	-
03												
04												
05	4000	B656	A605	C000	4000	0080	C000	8001	0000	0	1	-
06	....	....	....	....	....	....	....	....	....	7	0	-
07												
08	4000	3174	2608	C000	0008	0000	C000	8001	0000	13	1	-
09												
10	4000	B201	A513	C000	4000	0000	....	....	....	0	1	-
11	....	....	....	....	....	....	....	....	....	0	1	-
12	4000	B674	D112	....	....	....	....	....	....	0	1	-
13	4000	3174	260D	....	....	....	....	....	....	3	1	-
14	4000	3174	260E	....	....	....	....	....	....	331	1	-
15	4000	3174	260F	....	....	....	....	....	....	0	1	-

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

PF: 3=Quit 4=Execute 5=Refresh 8=Fwd 9=Ctr -> 0 12=Test Menu

Figure 2-77. Example of the Update 3174-Peer Status Panel

This test is available only from 1TEST.

Information is displayed for a port if a 3174-Peer device is powered on to that port. If you know 3174-Peer devices are powered on to ports on this hardware group yet you see no information for those ports, use Online Test 3 to check the status of the hardware group.

The update mode of this panel is shown. The display mode of the panel is similar to this, but it is titled "Display 3174-Peer", and no action column appears. PF4 does not appear in display mode, but PF9 does. Pressing PF9 on either the display panel or the update panel resets all the discarded frame counters to 0. PF4 executes the changes made in the Action field.

This test can be accessed only if configuration question 650 (3174-Peer) is answered **Y** (Yes), configuration question 652 (3174 LAN Manager) is answered **N** (No), and configuration question 653 (3174-Peer Online Test Updates) is answered **Y** (Yes).

Up to 15 lines can be displayed on each panel. If there are more than 15 lines, press PF8 to page forward to the next panel. Press PF7 to page back to the previous panel. Continuing to press PF8 will page you forward to the HG 27 ports if HG 27 is present.

Configuration B/C Online Tests

Port: Shows the terminal port number. If the information fields beside the port number are all blank, the device on this port is powered off, or no device is attached to the port.

Current Address: The current address is the default address specified during customizing unless the 3174-Peer device specifies its own individual address.

Functional Address and Group Address: The functional address and group address are used by the LAN Manager. These addresses are initially undefined and may be defined by the 3174-Peer device.

Discarded Frame Count: The discarded frame count identifies how many information frames that port has discarded because of congestion. Typing a zero (0) in the Action field and pressing Enter causes the discarded frame count to be zeroed for the corresponding 3174-Peer device.

Device Status: The device status shows the 3174-Peer Interface state. See the following table.

Screen Symbol	Interface State	Explanation
(blank)	Powered off	The 3174-Peer device is powered off.
0	Disabled	The 3174-Peer device is powered on and not communicating as a 3174-Peer device.
1	Enabled	The 3174-Peer device is powered on and communicating as a 3174-Peer device.
2	Enabled and Congested	The 3174-Peer device is enabled and congested within the last minute.
?	Disable Pending	The 3174-Peer device is enabled and the controller has requested the 3174-Peer device to disable the 3174-Peer interface.

Action: The action column is present only during update mode. When you type data into the action column and press PF4, the control unit processes the action. The entry is then replaced with an underscore and a refresh occurs. The valid entries into the Action column are **0** or **R**.

Typing in **0** and pressing PF4 zeroes the discarded frame counter.

Typing in **R** (Removed) and pressing PF4 disables the 3174-Peer interface as follows:

1. If the 3174-Peer interface is disabled already, the Removed request is ignored.
2. If the 3174-Peer interface is enabled, the 3174 stops frame processing for the device, displays a ? in the Device Status column, and issues a request to the device to disable the 3174-Peer interface. The 3174 waits for the device to disable the 3174-Peer interface. When the device disables the 3174-Peer interface, a refresh operation occurs and the 3174 displays 0 in the Device Status column.
3. If the 3174 previously has issued a disable request to the device but has not disabled the 3174-Peer interface, the 3174 logically disconnects the device.

Test 9, Option 10,u (u=update): Displays the 3174-Peer Bridge Profile panel and can be run either in display mode or in update mode. To invoke the test in display mode, do not enter the **u**; enter the **u** for update mode. If you invoke the test in update mode, you will be prompted for the password that was set up in configuration question 98. You must have this password to enter update mode. Figure 2-78 shows an example of the 3174-Peer Bridge Profile panel.

```

          _____ Update 3174-Peer Bridge Profile _____
1         Bridge Number           (0-F)
* 001    Token-Ring Segment Number (001-FFF)
* 002    3174-Peer Segment Number  (001-FFF)

7         Token-Ring Hop Count     (1-7)
Y         Frame Forwarding Active  (Y,N,W)
0010     Bridge Performance Threshold (0000-9999)
          (Frames Discarded Per 10,000)

02 : 00  Logging Interval         (00-99 Hours: 00-59 Minutes)
010     Alert Threshold           (000-255)

* Override to Customized Data

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

PF: 3=Quit  4=Save  12=Test menu
    
```

Figure 2-78. Example of a 3174-Peer Bridge Profile

This test is available only from 1TEST.

To display this panel, configuration questions 650 and 651 must be answered **Y** (Yes). Answering “Yes” to these two questions configures the 3174 for 3174 Peer communication and also specifies that it is configured as a bridge to a token-ring.

To update the information on this panel, configuration questions 650 and 651 must be answered **Y** (Yes), configuration question 652 must be answered **N** (No), and configuration question 653 must be answered **Y** (Yes). This combination of responses configures the controller for 3174 Peer communication, designates it as a bridge to a token-ring, and authorizes the use of online test updates, but does not configure the controller for the LAN Manager.

Note: You can update this information if LAN Manager is configured and no LAN Manager reporting links are active. PF4 (Save) will not be allowed if links become active during update.

Configuration B/C Online Tests

If you invoke this test in display mode, PF4 does not appear and you cannot change the values shown. In update mode, change the values by typing over the current values in the left-hand column on this screen and pressing PF4. Any fields that have been set last by the LAN Manager or have been changed by online test updates have "*" displayed next to them. Initially these values are specified during customization. The bridge number (0-9, A-F), token-ring segment number (001-FFF), and 3174-Peer segment number (001-FFF) are used to perform source routing. If you change these values, you may lose the connections between link stations.

Bridge Number: The bridge identifier that the user specifies in the 3174-Peer parameters. The bridge number distinguishes among parallel bridges. Parallel bridges connect the same two LAN segments.

Segment Numbers: Identifies any portion of a LAN (for example, a single bus or ring) that can operate independently but is connected to other parts of the establishment network by bridges, controllers, or gateways.

Token-Ring Hop Count: The number of bridges through which a frame has passed on the way to its destination.

Note: Hop count applies to all broadcast frames except single-route broadcast frames.

Frame Forwarding Active: This bridge parameter shows whether the bridge is forwarding frames or not. Entering **Y** shows the bridge should forward frames; entering **N** stops the bridge from forwarding frames; and entering **W** causes the token-ring adapter to open in Wrap mode.

There is a delay of up to two minutes for the Wrap mode connection. Use Wrap mode if you want host communications for your 3174-Peer devices but do not want to use your adapter as a station on the token-ring. The 3174 must be customized as the gateway for the 3174-Peer device if you want to use Wrap mode.

Note: Do not connect the token-ring adapter to a token-ring if you want Wrap mode. IML the controller with the adapter disconnected from the token-ring.

Bridge Performance Threshold: In IBM bridge programs, a value that shows the maximum allowable number of frames per 10,000 that are not forwarded across a bridge because of congestion. If this number exceeds the user-defined maximum, a "threshold exceeded" occurrence is counted and indicated to network management programs. Whenever the bridge performance threshold is exceeded, the bridge is recorded as congested for the minute where the threshold was exceeded. If the threshold is again exceeded in the next minute, the bridge is recorded as congested for that minute too, and so forth.

Logging Interval: The period that elapses between the bridge becoming congested and the logging of that congestion. If an alert is sent, the time elapsed in the logging interval is reset to zero.

Alert Threshold: The alert threshold specifies how many minutes the bridge may remain congested before an alert is sent to the network management programs. For example, if the alert threshold is set to four minutes and the bridge performance threshold is exceeded for four consecutive minutes, at the end of four minutes the alert will be sent.

Test 9, Option 11: Displays 3174-Peer bridge status and performance counters. Figure 2-79 shows an example panel of the 3174-Peer Bridge Status panel.

```

_____ Display 3174-Peer Bridge Status _____

Bridge Status:  Frame Forwarding Active
-----

Frames/bytes forwarded:      From Token-Ring      From 3174-Peer
                             -----
Broadcast frames             _,'___,'___,'___   _,'___,'___,'___
Broadcast bytes              ___,'___,'___,'___   ___,'___,'___,'___
Non-broadcast frames         _,'___,'___,'___   _,'___,'___,'___
Non-broadcast bytes          ___,'___,'___,'___   ___,'___,'___,'___

Frames not forwarded because:

Token-Ring inoperable                               _,'___
LAN segment congestion                               _,'___
Other Causes                                         _,'___

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

PF: 3=Quit    5=Refresh    8=Fwd    9=Ctr->0    12=Test Menu
    
```

Figure 2-79. Example of a 3174-Peer Bridge Status Panel

This test is available only from 1TEST.

Bridge Status:

- If the token-ring is inoperative, the following status message appears: Token-Ring Failure.
- If the token-ring is inoperative because the LAN Manager has removed the 3174-Peer Bridge Adapter from the 3174-Peer, the following status appears: Bridge Adapter removed by LAN Manager.
- If the token-ring is inoperative and the bridge has detected a token-ring segment number mismatch when inserting into the token-ring, the following status message appears: Token-Ring Segment Number Conflict.
- If frame forwarding is not active, the following status message appears: Frame Forwarding Inactive.
- If frame forwarding is active, the following status message appears: Frame Forwarding Active.
- If frame forwarding is set to Wrap mode, the following status message appears: Adapter in Wrap Mode.

Note: The following fields provide counts of bridge activity. If you press PF9, you can reset all the counters to zero.

Broadcast Frames: This is a count of the broadcast frames. A broadcast frame is simultaneously transmitted to more than one destination and forwarded by all bridges, unless otherwise restricted.

Broadcast Bytes: A count of the number of bytes contained within the Broadcast Frames that have been forwarded.

Configuration B/C Online Tests

Non-Broadcast Frames: A count of the non-broadcast frames. A non-broadcast frame contains a specific destination address. It may contain routing information specifying which bridges are to forward it. A bridge will forward a non-broadcast frame only if that bridge is included in the frame's routing information.

Non-Broadcast Bytes: The number of bytes contained within the non-broadcast frames.

LAN Segment Congestion: LAN Segment Congestion counters are incremented whenever a bridge buffer is needed but unavailable (hence causing the frame to be lost). When a frame from the token-ring is lost, the count in the From Token-Ring field is incremented; when a frame from the 3174-Peer LAN segment is lost, the count in the From 3174-Peer field is incremented.

When you press PF8, the second screen of the 3174-Peer Bridge Status Panel is displayed. First you will see the Discard Threshold Exceeded Counters panel for the previous 12 hours.

Display 3174-Peer Bridge Status																									
Discard Threshold Exceeded Counters																									
From Token-Ring													From 3174-Peer												
Hour	00	05	10	15	20	25	30	35	40	45	50	55	00	05	10	15	20	25	30	35	40	45	50	55	
00:00	
01:00	
02:00	
03:00	
04:00	
05:00	
06:00	
07:00	
08:00	
09:00	
10:00	
11:00	

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

PF: 3=Quit 5=Refresh 7=Back 8=Fwd 12=Test Menu

Figure 2-80. Example of a 3174-Peer Bridge Status Panel Showing the Previous 12 Hours

The Discard Threshold Exceeded Counters panels display the number of one minute intervals within each five minute period that the bridge is congested. The bridge is considered congested for one minute whenever the bridge percentage threshold of discarded frames has been exceeded. For each minute the bridge is congested, the period on the panel for that time segment is replaced with the appropriate number (1–5). Updates for the previous five minutes are displayed at 00:00 hour 00 minutes. Updates for the five minutes from 00 to 05 minutes are displayed at 00:00 hour 05 minutes, and so on.

Note: If you press PF8 again a second Discard Threshold Exceeded Counters screen will appear, showing the previous 13 – 24 hours.

Test 9, Option 12,u (u=update): Displays the LAN Manager Profile and shows information about each reporting link. You can run this test either in display mode or in update mode. To invoke the test in display mode, do not enter the **u**; enter the **u** for update mode. If you invoke the test in update mode, you will be prompted for the password that was set up in configuration question 98. You must have this password to enter update mode. Figure 2-81 on page 2-233 shows an example of the LAN Manager Profile panel in Update Mode.

Update LAN Manager Profile		
Link/Type	0/n	1/n
Password	pppppppp	pppppppp
Congestion Frame Ctr	nnnnn	nnnnn
Link Address	nnnnnnnnnnnnF4	nnnnnnnnnnnnF4
Number of Hops	n	n
TR Fn Classes	nnnnnnnn	nnnnnnnn
3174-Peer Fn Classes	nnnnnnnn	nnnnnnnn
Link/Type	2/n	3/n
Password	pppppppp	pppppppp
Congestion Frame Ctr	nnnnn	nnnnn
Link Address	nnnnnnnnnnnnF4	nnnnnnnnnnnnF4
Number of Hops	n	n
TR Fn Classes	nnnnnnnn	nnnnnnnn
3174-Peer Fn Classes	nnnnnnnn	nnnnnnnn

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

PF: 3=Quit 4=Save 5=Refresh 9=Ctr->0 12=Test Menu

Figure 2-81. Update LAN Manager Profile Panel

This test is available only from 1TEST.

Configuration question 650 (3174-Peer configuration), configuration question 651 (3174-Peer bridge configuration), configuration question 652 (LAN Network Manager), and configuration question 653 (3174-Peer Online Test Updates) must be answered **Y** (Yes) before you can invoke this test in update mode. You can invoke the test in display mode if configuration questions 650, 651, and 652 are answered **Y**.

When this option is selected in update mode, only the LAN Manager passwords can be changed; to update, type the new password over the one currently displayed and press PF4.

Link/Type: The Link/Type field displays the reporting link number 0, 1, 2, or 3 and one of the following types:

- 0 - Controlling LAN Manager
- 1 - Alternate LAN Manager
- 2 - Observing LAN Manager.

Password: Used by the LAN Manager to connect itself into the bridge. Originally customized using configuration questions 690–693.

Test 10 Configuration B/C: Port Wrap Tests

This test is available only from 1TEST. Test 10 runs a wrap test on ports on the Terminal Adapter, the TMA card, and the 3299 Models 2, 3, and 32. Test 10 does 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 does not interrupt the operation of that terminal. The wrap test is not performed, and the test shows that the selected port is in use. This test cannot be run on the requesting terminal. The results of the port wrap test are indicated by a text message on line 23. 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**; the Port Wrap Test menu is displayed.
4. Type in the option you desire from the menu displayed in Figure 2-82.
5. Press **Enter**.

Port Wrap Test	
Option	Description
1,n,m	Direct wrap for terminal adapter port n on HG m
2,n,m	3299/terminal multiplexer wrap for port n on HG m
(n=0-31) (m=26-27)	

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 7=Back 8=Fwd 12=Test Menu

Figure 2-82. Test 10: Port Wrap Test Menu

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 Status Codes* manual for recovery action.

Test 10, Option 1,n,m (Direct Wrap):

- For Models 1L through 14R and 21H through 24R *without* the 3270 Port Expansion Feature, valid Terminal Adapter port numbers are 0, 8, 16, and 24; the valid HG is 26.
- For Models 11L through 14R *with* the 3270 Port Expansion Feature, valid port numbers are 0, 8, 16, and 24; the valid HGs are 26 and 27.
- For Models 21H through 24R *with* the 3270 Port Expansion Feature, valid port numbers are 0, 8, and 16; the valid HGs are 26 and 27.
- For Models 51R through 64R, valid port numbers are 0 through 8 and the valid HG is 26.

Configuration B/C Online Tests

- For Models 81R, 82R, 91R, and 92R, valid port numbers are 0 through 3 and the valid HG is 26.
- For Model 90R, the valid port number is 0 and the valid HG is 26.

Test 10, Option 2,n,m (Multiplexer Wrap):

- For Models 1L through 14R and 21L through 24R *without* the 3270 Port Expansion Feature, valid Terminal Adapter port numbers are 0, 8, 16, and 24; the valid HG is 26.
- For Models 11L through 14R *with* the 3270 Port Expansion Feature, valid port numbers are 0, 8, 16, and 24; the valid HGs are 26 and 27.
- For Models 21H through 24R *with* the 3270 Port Expansion Feature, valid port numbers are 0, 8, and 16; the valid HGs are 26 and 27.
- For Models 51R through 64R, valid port numbers are 0 through 15 and the valid HG is 26.
- For Models 81R through 92R, valid port numbers are 0 through 7 and the valid HG is 26.

Test 11 Configuration B/C: 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.

Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests

This test is available only from 1TEST. Test 12 provides a test facility for terminals, ports, cables, and programmable modems attached to an Asynchronous Emulation Adapter (AEA). It also provides a status summary for all ports of the three Asynchronous Emulation Adapter hardware groups (HGs), and allows line errors to be reset for an individual Asynchronous Emulation Adapter port or for all ports of a specific Asynchronous Emulation Adapter HG. Figure 2-83 shows the menu for this test.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/12**
3. Press **Enter**; the Asynchronous Emulation Adapter Tests panel is displayed.
4. Type in the option number.
5. Press **Enter**.

```

_____ Asynchronous Emulation Adapter Tests _____
Option      Description
1           AEA port tests menu
2           Display status summary
3           Reset line errors on all AEA HGs
3,n         Reset line errors on HG n
4,m,n      Display error counters for port m on HG n
5,m,n      Display connectivity for port m HG n
6,m,n      Wrap port m on HG n
7,m,n      Test cable - port m on HG n
8,m,n      DLUR display connectivity for port m on HG n

NOTES:
- Option 1 exits from 3174 test mode
- Options 6 and 7 utilize the AEA wrap plug

m=0-7      n=21-23

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

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

Figure 2-83. Test 12: Asynchronous Emulation Adapter Tests Menu

Test 12, Option 1: This test option shows the Asynchronous Emulation Adapter Port Tests Menu, from which you can select a specific terminal, port, or programmable modem to test. See Figure 2-84 on page 2-238 for an example of the port test menu.

Configuration B/C Online Tests

Asynchronous Emulation Adapter Port Tests

Option	Description
1,m,n	Connect to smart-modem
2,m,n	Transmit data (default settings)
2,m,n,WXYZZ	Transmit data (override settings)

NOTES:

- Use MENU REQUEST key sequence to return to this menu when above options are selected
- Use Test Request key sequence to return to 3174 test mode

m=Port Number (0-7) n=Hardware Group (21-23)
WXYZZ=Override port and station descriptor values

Select option; press ENTER ==>_

PF: 3=Quit

Figure 2-84. Asynchronous Emulation Adapter Port Tests Menu

Option 1: Select option 1 on the Asynchronous Emulation Adapter Port Tests Menu to access and test a programmable modem through its Asynchronous Emulation Adapter port, if the port is not currently in session. Access and manipulation of the modem, using that modem's command syntax, allows the following:

- Modem Customizing and Test

This function provides access to internal diagnostic and customizing procedures built into certain programmable modems. There are two reasons why this function is important:

1. By running diagnostics internal to the modem, you can isolate a problem in the asynchronous communication equipment on a specific port, provided proper operation of the Asynchronous Emulation Adapter port has already been verified.
2. By customizing the modem to certain specifications, you can ensure proper operation or verify whether the modem had been customized correctly for normal operation.

- Modem Dial-out Function

This function allows you to test the dial-out capability of the modem. By providing a number to the modem of a phone nearby or of an actual AEA dial-in port, you can verify proper operation of the modem.

Option 2: Select option 2 on the Asynchronous Emulation Adapter Port Tests Menu to verify an ASCII terminal's ability to transmit and receive data correctly. From the invoking terminal, you can send data through the Asynchronous Emulation Adapter port connector to a terminal not currently in session. This test verifies the data path and the operation of the terminal receiving the data.

Example of Option 2,m,n Test:

1. At any ASCII terminal, terminate the customer application or session (if active) and return to the Connection Menu.

2. For most ASCII terminals, hold down **ESC** and press **T** to enter test mode. (For those terminals that do not accept Esc and T for test mode, see the *3174 Terminal User's Reference for Expanded Functions*.)
3. From the 3174 Test Menu, select Option 12 (Asynchronous Emulation Adapter Tests).
4. From the Asynchronous Emulation Adapter Test Menu, select Option 1 (AEA Port Tests Menu).
5. From the AEA Port Tests Menu, type in **2,m,n** where
 - m = Port Number (0–7) of the device being tested
 - n = Hardware Group (21, 22, or 23) of the device being tested.
6. Press **carriage return**.
7. The controller responds with a **READY** message.
8. Perform steps a and b **only** if the device being tested is attached to a switched port with a programmable modem. If the port is nonswitched, go to step 9.
 - a. Type in **ATD9, XXX-XXXX** where ATD (uppercase characters) must be keyed in while you are holding the shift key. 9 is the access code (optional), and ,, is two 2-second pauses. XXX-XXXX is the phone number of the programmable modem attached to the device being tested.
 - b. Press **carriage return**. The controller responds with a **CONNECT** message.
9. Type in a test message or any string of characters.
The message or characters do not appear on the terminal you are using.
10. Press **carriage return**. The data appears on the device being tested.
11. A test message can then be entered at the device being tested and sent back to the invoking terminal by keying in the test message and pressing carriage return.
12. To return to the Asynchronous Emulation Adapter Tests menu, press **ESC**, hold down **CTRL**, and press **H**.

The override settings, indicated by WXYZZ on the test menu, are parameters used by the controller to communicate with ASCII devices. These parameters are entered during customizing and this test allows you to temporarily change them without changing the actual customizing.

The following chart shows the values for WXYZZ.

Note: You can determine the current values of these parameters by invoking Test 12, Option 5. If you enter override settings, you may also need to change the setup options on the ASCII devices you are testing.

W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Odd	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Even	20 = DTR	
3 = 1200 bps	3 = None	80 = XON/XOFF (any)	
4 = 2400 bps	4 = Space	C0 = XON/XOFF (XON)	
5 = 4800 bps	5 = Mark		
6 = 9600 bps			
7 = 19 200 bps			

Configuration B/C Online Tests

Test 12, Option 2: Figure 2-85 an example of a Test 12 Status Summary panel.

```

_____ Status Summary _____
Port          HG 21          HG 22          HG 23
Address       0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7    0 1 2 3 4 5 6 7

Attach        d s d d l   s l
Status        1 1 1 0 1 x 0 -    (Disabled)          (Not present)
Station       v v v p h   ? h
Line          . . : . .   *
LU            + + +

d = direct      l = on          v = video display    . = 0 errors
l = non-switched 0 = off        p = printer          : = 1-50
s = switched    - = disabled     h = host             / = 51-100
+ = in session  x = unconfigured ? = unknown        * = >100
c = combination
  
```

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

PF: 3=Quit 12=Test Menu

Figure 2-85. Example of an Asynchronous Emulation Adapter Status Summary Panel

Port Address: Shows the terminal port number (0–7) for HG 21, 22, and 23.

Attach: Shows how the terminal is attached to the Asynchronous Emulation Adapter port.

```

blank Nothing attached (port unconfigured)
d      Direct attachment
s      Switched attachment
l      Nonswitched attached
  
```

Status: Shows the state of the terminal at the time the status summary was requested.

```

Disabled   This Asynchronous Emulation Adapter is in the disabled state
Not present This AEA is not installed in the controller
0          The terminal on that specific port power is switched off (no current connection.)
1          The terminal on that specific port is switched on (connection present.)
x          The port is not configured
-          The terminal or specific port is in a disabled state (no connections possible, unusable.)
  
```

Station: Shows the type of terminal to which a specific port is connected.

- blank Nothing attached (port unconfigured)
- ? Unknown station type (no station has connected yet)
- v Video display station
- p Printer station
- h Host station
- c Combination: display with attached printer (HAP.)

Line: Shows the number of parity, framing, and overrun errors that have been recorded on a particular port.

- . 0 errors recorded
- : 1—50 errors recorded
- / 51—100 errors recorded
- * Over 100 errors recorded.

LU: Shows whether the SNA session is bound and active.

- blank Session is not bound
- + Session is bound (on at least one logical terminal).

Test 12, Option 4: This option provides a facility to display the error counters for a particular Asynchronous Emulation Adapter port. Figure 2-86 is an example of a disabled adapter and a disabled port.

```

_____ Error Counters for PN 02, HG 21 _____
Adapter (HG) status:           Disabled
Port (PN) status:             Powered off due to error
Error counters—

Framing error:                12345
Overrun error:                 54321
Parity error:                  11111
    
```

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

PF: 3=Quit 12=Test menu

Figure 2-86. Example of an AEA Error Counters Panel Showing a Disabled Adapter and Disabled Port

A framing error shows that the proper number of stop bits were not received. An overrun occurs if data is received at a faster rate than the AEA can process it in the receiving hardware. Invalid or incorrect parity

Configuration B/C Online Tests

results in the parity error indication. These counters show the number of these errors that are detected since these counters were last reset.

Test 12, Option 5: This option provides a facility to display the connectivity for a particular Asynchronous Emulation Adapter port. Figure 2-87 is an example of an enabled adapter and a display connected to an ASCII host and to a TCP/IP host.

```
_____ Connectivity for PN 02, HG 21 _____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device type:              Video display
Line speed/Parity         1200 / Odd
Flow control/Stop bits    XON/XOFF(XON) / 1

Current connectivity-

      LT   Bound  Host      IDn   HG_PN   Host/Station Name
      1    n/a   n/a      n/a   21_06   ASCII HOST
      2    n/a   n/a      n/a   21_06   009.067.007.200 (See note below)
```

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

PF: 3=Quit 12=Test menu

Figure 2-87. Example of an AEA Connectivity Panel Showing an Enabled Adapter and Display/Printer with an ASCII Host

Note: 009.067.007.200 shown for LT 2 Host/Station Name in Figure 2-87 is an example of an IP address for a TCP/IP host.

Test 12, Option 6: This test option provides a facility to display the status of specific leads when you are performing a port wrap test. This test is used to verify the cables and connections between the driver/receiver modules on the adapter card and the port connector. A properly operating adapter port results in the port wrap status panel shown in Figure 2-88 on page 2-243.

After you select this option, the system prompts you for a password. If a password was not set up in configuration question 98, you will receive an error message. Before you can use this option, configuration question 98 must have a password defined.

Note: The AEA wrap plug (15-pin, P/N 39F6853) should be installed on the port connector before you perform the port wrap test.

Wrap Status for Port PN nn, HG mm	
Lead Raised	Leads recognized in response
SD	RD
RTS	DCD/CTS
DTR	DSR RI

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

PF: 3=Quit 12=Test menu

Figure 2-88. Example of and AEA Port Wrap Status Panel.

If you are running Configuration Support B Release 2 microcode or higher, at completion of the wrap test, the port is reset and returned to service. You can use this test to reactivate a port that is disabled because of an error.

Test 12, Option 7: This option displays the status of specific cable leads when performing a port cable wrap test. This test is used to verify the internal and external cables and connections between the driver/receiver circuits on the AEA card and the device or modem end of the customer cable.

After you select this option, the system prompts you for a password. If a password was not set up in configuration question 98, you will receive an error message. Before you can use this option, configuration question 98 must have a password defined.

If you are running Configuration Support B Release 2 microcode or higher, at completion of the cable test, the port is reset and returned to service. You can use this test to reactivate a port that is disabled because of an error. Use Test 12, Option 6 for additional problem isolation.

This option requires two tests to determine the current connectivity of an AEA cable:

1. Invoke /12,7,PN,HG with the AEA cable disconnected from the modem or device. The leads recognized in response to each lead raised shows shorts that exist in the cable. These shorts can be caused by damage to the cable or by intentionally installed jumpers. See Figure 2-89 on page 2-244.
2. Invoke /12,7,PN,HG with the AEA cable wrap plug (25-pin, P/N 61X4602) attached to the end of the AEA cable in place of the modem or direct connect device. The leads recognized in response to this test should be those shown in Figure 2-89 on page 2-244 plus any additional ones discovered by running this test without the wrap plug. See Figure 2-89 on page 2-244. If the expected leads recognized do not appear in the list, then there are missing, broken, or disconnected leads in the cable. (These can be intentional or the result of a damaged cable.)

Configuration B/C Online Tests

Once these two cable tests have been conducted, the connectivity of the cable has been determined. The customer must compare this connectivity with the cable requirements for the device attached to this port to determine if a cable problem exists.

Note: The cable test may not work for cables longer than half the maximum recommended cable lengths for the 3174 AEA ports. See *3174 Site Planning* for recommended cable lengths.

```
_____ Wrap Status for Port PN nn, HG mm _____  
Lead Raised          Leads recognized in response  
SD                   RD  
RTS                  DCD/CTS  
DTR                  DSR RI
```

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

PF: 3=Quit 12=Test menu

Figure 2-89. Example of an AEA Cable Test Report Panel.

| **Test 12, Option 8,m,n:** This option displays the DLUR connectivity for a particular AEA port.
 | Figure 2-90 shows an example of an enabled adapter and a secondary LU display connected to a primary
 | LU in an APPN DLUR network.

```
|
|           _____ DLUR Connectivity for PN * , HG * _____
|
| Adapter (HG) status:      Enabled
| Port (PN) status:        Powered on
| Device Type:             Video Display (MLT)
| Line speed/Parity:       1200 / Odd
| Flow control/Stop bits:  XON/XOFF(XON) / 1
|
| Current connectivity-
|
|      LT  LU Name  DLUS CPNAME  PLU CPNAME  PLU-SLU Link ID
|      1  APPLVM13  DLUSNM12.NETID502  PLUNM012.NETID502  22
|      2
|      3
|      4  APPLVM43  DLUSNM12.NETID502  PLUNM012.NETID502  22
|      5
|      P
|
| To go directly to other tests, enter: /Test,Option
| Select test; press ENTER ==>_
|
| PF: 3=Quit   7=Back   8=Fwd   12=Test menu
|
```

| *Figure 2-90. Example of a Test 12, Option 8 DLUR Connectivity Panel Showing DLUR LU Status*

- | **LU Name:** The network name of the secondary logical unit received in the ACTLU request from the DLUS.
- | **DLUS CPNAME:** Identifies the fully qualified Control Point name of the DLUS node.
- | **PLU CPNAME:** Identifies the fully qualified Control Point name of the node containing the primary logical unit (application).
- | **PLU-SLU link ID:** Identifies the link on which the PLU-SLU session exists.

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 host response, the screen is cleared. If a link-level error occurs, the hardware attempts retransmission of the alert. If the data has been lost because of an error above the link level (DACTPU), the information can be lost without any error indication to the operator.

If an attempt is made to request an operator-generated alert screen from an unauthorized display station, the operator unauthorized indicator is displayed in the operator information area.

If other than the basic characters have been entered from the keyboard, the try again (X ? +) indicator is displayed.

If a communication check is detected, the Input Inhibited and Communication Reminder symbols, followed by a 5xx number, are displayed.

Test D Configuration B/C: Distributed Function Terminal Dump

This test is available only from 1TEST. You can request a dump of a distributed function terminal, such as a 3290, from a 3278 or similar display station. For example, after a 3290 has been downstream-loaded and a failing symptom is present, remove the diskette from diskette drive 1 or 2, and insert the 3174 dump diskette (P/N 73X3726). When the diskette is removed from the 3174, a status code of 38X may appear in the Status indicators. This is a normal indication and stops when the dump diskette has finished loading its control program into controller storage.

Perform the following steps to request a dump of a distributed function terminal.

1. Press and hold **ALT**; press **TEST**.
2. Type in **/D**
3. Press **Enter**; the Distributed Function Terminal Dump panel is displayed.
4. Remove the diskette from drive 1 or 2 and insert the 3174 dump diskette.
5. Type in **/d,n,m** (n = The port number of the DFT, m = the HG for the DFT's port). Valid port numbers are 0–31. Valid HGs are 26–27.
6. Press **Enter**.

When the request is successfully received and the dump is initiated, a plus sign (+) appears adjacent to the m:

```
/d,n,m+
```

While the dump is in progress, the 3174 status display shows alternating codes 4671 and 4672. After approximately 10 minutes, the dump is completed and 4675 is displayed.

7. Remove the dump diskette.
8. Reinstall the previously removed diskette.
9. Exit test mode.

Configuration B/C Online Tests

The terminal for which the dump was taken requires a power-on reset. This ensures a new downstream load of that terminal.

Note: Only one DFT dump is allowed at a time. If a request is entered for a port that is switched off and does not have a DFT connected (this is a valid request), a DFT dump cannot take place. In approximately 20 seconds, a timer aborts the dump request and clears the DFT dump facility resource. During these 20 seconds, if another dump request is entered, a wrong number indicator appears in the indicator row.

If the DFT dump test request is rejected, one of the following can appear:

X-f appears if another DFT dump is already in progress.

/d,n- appears if a 3174 dump diskette is not available in one of the controller diskette drives.

X #? appears if the terminal that was selected to be dumped is not a distributed function terminal.

Test 13 Configuration B/C: ESCON Adapter Tests

Test 13 is available only from 1TEST on a Model 12L or a Model 22L. To display the Enterprise Systems Connection* (ESCON*) Adapter Tests menu shown in Figure 2-92, perform the following procedure at a 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/13**
3. Press **Enter**; the ESCON Adapter Tests menu is displayed.
4. Type in the option number.
5. Press **Enter**.

```

_____ ESCON Adapter Tests _____
Option      Description
  1         Display adapter status
  2         Reset error counters
  3         Run Adapter Internal wrap test
  4         Run Adapter External wrap test

- Hosts or Enterprise Systems Connection Channel is online
- Options 3 and 4 require taking offline
- Option 4 requires a wrap plug
```

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

PF: 3=Quit 12=Test menu

Figure 2-92. Test 13: ESCON Adapter Menu

Before selecting Options 3 or 4, you must take the controller offline.

When the controller is online, the following messages are displayed on the test menu:

- Hosts or Enterprise Systems Connection Channel is online
- Options 3 and 4 require taking offline

Test 13, Option 1: This option displays the status of the Enterprise Systems Connection Adapter. Figure 2-93 is an example of the panel displayed if the hosts or ESCON channel is online.

```

_____ ESCON Adapter Status _____

3174 Controller -
  Model/Serial number      22L/AB12345
  Link Address             35

Status -
  Adapter                  Enabled
  Transmit                 Normal transmission
  Receive                  Normal transmission

Error counters -
  BER threshold exceeded   0
  CRCs                    0
  Loss of light            0
  Timeouts                 0
  
```

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

PF: 3=Quit 5=Refresh 12=Test menu

Figure 2-93. Example of an ESCON Adapter Status Panel (Online Mode)

If the hosts or ESCON channel is not online, Figure 2-94 or Figure 2-95 is displayed. If no other user is running a wrap test or a continuous offline sequence (OLS) test on the ESCON Adapter, PF9 appears and can be used to start and stop sending continuous offline sequence.

Configuration B/C Online Tests

```
_____ ESCON Adapter Status _____  
  
3174 Controller -  
  Model/Serial number      22L/AB12345  
  Link Address             12 Last Known  
  
Status -  
  Adapter                  Enabled  
  Transmit                 Not Operational Sequence  
  Receive                  Not Operational Sequence  
  
Error counters -  
  BER threshold exceeded   0  
  CRCs                     0  
  Loss of light            0  
  Timeouts                 0  
  
To go directly to other tests, enter: /Test,Option  
Select test; press ENTER ==> _  
PF: 3=Quit    5=Refresh    9=OLS On    12=Test menu
```

Figure 2-94. Example of ESCON Adapter Status Panel (Offline Mode—OLS Not Running)

```
_____ ESCON Adapter Status _____  
  
3174 Controller -  
  Model/Serial number      22L/AB12345  
  Link Address             12 Last Known  
  
Status -  
  Adapter                  Enabled  
  Transmit                 Continuous Offline Sequence  
  Receive                  Not Operational Sequence  
  
Error counters -  
  BER threshold exceeded   0  
  CRCs                     0  
  Loss of light            0  
  Timeouts                 0  
  
- Continuous OLS running -  
  
To go directly to other tests, enter: /Test,Option  
Select test; press ENTER ==> _  
PF: 3=Quit    5=Refresh    9=OLS Off   12=Test menu
```

Figure 2-95. Example of ESCON Adapter Status Panel (Offline Mode—OLS Running)

One of the following messages may be displayed if you try to run OLS:

4607-Adapter disabled. Request cannot be performed.
4705-Request only valid with hosts offline
4706-Test already active request denied
4707-Adapter busy
4709-Adapter error. Request not completed.

Test 13, Option 2: This option resets the Enterprise Systems Connection Adapter error counters. The following messages are displayed:

4607-Adapter disabled. Request cannot be performed.
4704-Error counters have been reset.

Test 13, Option 3: This option runs the internal Enterprise Systems Connection Adapter wrap test. One of the following messages is displayed:

4607-Adapter disabled. Request cannot be performed.
4700-Adapter internal wrap test failed
4701-Adapter internal wrap test passed
4705-Request only valid with hosts offline
4706-Test already active request denied
4707-Adapter busy
4709-Adapter error. Request not completed.

These conditions must be met for the test to run:

1. The controller must **not** be online with any of the attached hosts. If any host or controller is in the online mode, the following appears:
 - Hosts or Enterprise Systems Connection Channel is online
 - Options 3 and 4 require taking offlineIf you attempt to select option 3 while online, the following message appears:
4705-Request only valid with hosts) offline.
2. The adapter must be functional. If the adapter is not functional, then 4607-Adapter disabled is displayed on the option menu.
3. No other user should be running the external/internal wrap test or sending continuous OLS.

Configuration B/C Online Tests

Test 13, Option 4: This option runs the external Enterprise Systems Connection Adapter Wrap test. One of the following messages is displayed:

4607-Adapter disabled. Request cannot be performed.
4702-Adapter external wrap test failed
4703-Adapter external wrap test passed
4705-Request only valid with hosts offline
4706-Test already active request denied
4707-Adapter busy
4709-Adapter error. Request not completed.

These conditions must be met for the test to run:

1. The controller must **not** be online with any of the attached hosts. If any host or controller is in the online mode, the following messages are displayed on the test menu:
 - Hosts or Enterprise Systems Connection Channel is online
 - Options 3 and 4 require taking offlineIf you attempt to select option 4 while online, the following message appears:
4705-Request only valid with hosts offline.
2. The wrap plug must be installed on the Enterprise Systems Connection Adapter card.
3. The adapter must be functional. If the adapter is not functional, then 4607-Adapter disabled is displayed on the option menu.
4. No other user should be running the external/internal wrap test or sending continuous OLS.

Test 14 Configuration B/C: 3174 Operator Functions

This test enables you to do the following tasks:

- | • IML the controller
- | • Set the time on the 3174 internal clock
- | • Copy dump data from fixed disk to a dump diskette
- | • Erase dump data from fixed disk
- | • Disable the automatic dump function

To perform either test, you must enter the password set in customization Question 98.

This test can be run from 1TEST, 2TEST, and 3TEST. To request the 3174 Operator Functions panel shown in Figure 2-96, perform the following procedures at a 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in /14
3. Press **Enter**; the 3174 Operator Functions panel is displayed.
4. Type in the option number.
5. Press **Enter**.

```

|
|
|           _____ 3174 Operator Functions _____
|
| Option      Description      (Relative Day/Time since last POR: 008/10:45)
|
| 1,n,m,*    IML (n = drive: 1,2,3,4,or 8; 8 = search order 3,4,1,2)
|              (m = IML type: 41=Normal, 42=Back Level, 43=Trial)
|              (44 = Dump the controller)
|              (* is optional, * = d or t)
|              (d = delay in minutes)
|              (t = n,m; n = hours : 24 hour clock; m = minutes)
| 2,n,m      Set Time (n = hours : 24 hour clock; m = minutes)
| 3,n,m      Copy Dump (n = fixed disk; m = diskette drive)
|
|
| - Warning: IML will disrupt all Host communications
|              and controller functions
|
| To go directly to other tests, enter: /Test,Option
| Select Option; press ENTER ==> _
|
| PF: 3=Quit 12=Test menu
|

```

Figure 2-96. Test 14: 3174 Operator Functions

Test 14 requires you to enter a password when selecting either of the options.

Configuration B/C Online Tests

- | **Test 14, Option 1,n,m,*:** Choosing this option allows you to IML the controller. To select the option, type **1,n,m,*** (n=drive, m=IML type, *=d or t - Delayed IML).
- | The delayed IML * may be specified in minutes (d,0 to 254) or it may be specified in actual time-of-day (t,n,m) using the 24-hour-clock format. For example, to delay a normal IML to 2:15 PM, enter on the Test 14 select option line:
- | **1,1,41,t,14,15**
- | An example of delaying a normal IML 45 minutes would be entered as follows:
- | **1,1,41,d,45**
- | Selecting Dump the Controller option (m=44) will initiate a dump to diskette provided a dump diskette is installed in diskette drive 1 or 2.
- | After you select this option, the system prompts you for a password. You must enter the password to perform the IML. If a password was not set up in configuration question 98, error code 4713 is displayed. Before you can IML the controller from Test 14, configuration question 98 must have a password defined.

When performing this test, it is important to request the correct level of code from the correct Control disk. Re-IMLing with a different Control disk can result in different customization options being set for the controller.

Note: If you are using a NetView terminal to perform the IML, the password **will appear** on the display screen as you type.

Test 14, Option 2,n,m: This option allows you to set the hours in the 3174 internal clock to reflect the actual time of day. The 3174 internal clock will require resetting if:

- The 3174 has been powered off, powered back on, and re-IMLed.
- A new Control disk has been IMLed.
- The clock was set using Test 14, Option 2, then an Alt-1 IML was performed, and the offline SET TIMER function was used.
- A media error occurred when Test 14, Option 2, was being used. The time is set even if a media error occurs, but if the media error is not corrected, then the time will only remain valid until the controller is re-IMLed.

If the controller was IMLed from a diskette drive, then the Control disk must be in the drive while the test is run to avoid a media error (and so to keep the time that has been set valid across IMLs.)

To select the option, type **2,n,m** (n=hours, m=minutes) at the command line and press **Enter**. Enter the values for hours and minutes using 24-hour time.

After you select this option, the system prompts you for a password. You must enter the password to change the time. If a password was not set up in configuration question 98, error code 4713 displays when you attempt to enter a password.

After you enter the actual time of day in Option 2, the events appearing in the online event log will then have actual time readings displayed in the Time field. For example, if you entered the time of day as h=16 m=00 and an event was recorded in the online event log 10 minutes later, the time in the event log would read 16:10. However, using this test does not affect the preexisting count of the days. They will continue to be computed on the basis of 24-hour units of time elapsed since the power on of the controller.

Note: If you are using a NetView terminal, the password **will appear** on the display screen as you type. At the completion of this test, the new time appears in the upper right-hand section of the panel. Figure 2-96 on page 2-253 shows the time before Test 14, Option 2 was run; Figure 2-97 on page 2-255 shows the time changed after the test was run.

```

|
|
|           _____ 3174 Operator Functions _____
|
| Option      Description      (Relative Day/Time since last POR: 008/11:59)
|
| 1,n,m,*    IML (n = drive: 1,2,3,4,or 8; 8 = search order 3,4,1,2)
|              (m = IML type: 41=Normal, 42=Back Level, 43=Trial)
|              (44 = Dump the controller)
|              (* is optional, * = d or t)
|              (d = delay in minutes)
|              (t = n,m; n = hours : 24 hour clock; m = minutes)
|
| 2,n,m      Set Time (n = hours : 24 hour clock; m = minutes)
|
| 3,n,m      Copy Dump (n = fixed disk; m = diskette drive

```

```

|
| - Warning: IML will disrupt all Host communications
|              and controller functions
|

```

```

|
| To go directly to other tests, enter: /Test,Option
| Select Option; press ENTER ==>
| 4713-Restricted Function. Enter Online Test Password to continue.
| PF: 3=Quit 12=Test menu
|

```

Figure 2-97. Example of a 3174 Operator Functions Panel After Completing Option 2

Test 14, Option 3,n,m: This option is used if you have installed the Dump on Hard Drive utility on the controller and a manual or automatic dump to fixed disk 3 has occurred.

This option allows you to:

- Copy dump data from fixed disk 3 to a dump diskette
- Erase dump data from the fixed disk
- Disable the automatic dump function

After you select this option, the system prompts you for a password. You must enter the password to perform any dump copy function. If a password was not set up in configuration question 98, error code 4713 is displayed when you attempt to enter a password, and you cannot continue with this procedure.

Copy Dump Data to Dump Diskette (Option 3,3,m): To copy dump data to dump diskette, put a 3174 dump diskette in diskette drive 1 or 2 (this must be done before selecting the dump option). After you select Test 14, type **3,3,m** (m=1 or 2 for diskette drives 1 or 2.) on the select line and press **Enter**.

Enter the password. Dump copy process has been started is displayed. During the dump process the operator panel displays 5944 alternating with 5945 to indicate that the dump is in progress.

Configuration B/C Online Tests

- | When 5940 is displayed, remove the full diskette and insert another 3174 dump diskette. At the end of the dump copy process, one of the following status codes is displayed on the operator panel.
- | 5916 Copy dump finished without errors
- | 5919 Copy dump finished with errors
- | Activation of the copy dump process is reflected in the Event Log by the following status codes.
- | 4714 01 Copy dump process started
- | 4714 16 Copy dump process ended without errors
- | 4714 51-69 Copy dump process ended with errors
- | If errors occur, see *3174 Status Codes* for recovery action.
- | **Discard Dump Data from Fixed Disk (Option 3,3,0):** The dump data on fixed disk 3 can be discarded without copying it to a dump diskette. After you select Test 14, type **3,3,0** and press **Enter**. Enter the password. Dump data has been erased displays.
- | After the dump data on the fixed disk is discarded, the automatic dump function is enabled if it is configured.
- | The message Dump data has been erased is displayed also if the discard option is invoked and there is no valid dump data on the fixed disk,
- | **Disable Automatic Dump Function (Option 3,0,3):** When configured ON, the automatic dump function can be temporarily disabled provided fixed disk 3 contains no valid dump data. After you select Test 14, type **3,0,3** and press **Enter**. Enter the password. Auto Dump on fixed disk is now disabled displays.

Test 15 Configuration B/C: 3270 Host Status Summary

Test 15 allows a network operator to view the operational status of the hosts configured on a network. This test can be run from 1TEST, 2TEST, or 3TEST. Invoking Test 15 from 1TEST displays status information for all hosts configured for this controller. 2TEST and 3TEST invocations provide information about hosts on secondary links.

To request the Host Status Summary panel shown in Figure 2-98 on page 2-257, perform the following procedure at a 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/15**
3. Press **Enter**; the 3270 Host Status Summary panel is displayed.
4. Type in the option number.
5. Press **Enter**.

3270 Host Status Summary

ID	Host Descriptor	HG	Attach	Connection Status
1A	3270 type IBM host	31	T/R	500-01 Up
1B	3270 host		DLUS	Active
1C	3270 type IBM host	31	T/R	505-10 Down
1D	3270 type IBM host	31	T/R	399-27 Down
2A	3270 host	51	SDLC	Adapter disabled
3A	3270 host		X.25	Adapter not present

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

PF: 3=Quit 5=Refresh 12=Test Menu

Figure 2-98. Example of a Host Status Summary Panel

If more than 14 hosts are configured, PF8 appears at the bottom of the first panel, enabling you to page forward to the second panel. This panel contains the remaining hosts with PF7 at the bottom for paging back to the previous panel. Pressing PF5 refreshes the screen currently displayed.

ID: The identifying number assigned to that particular host at customization.

Host Descriptor: The description of the host, based on the Host Descriptor field in the Multi-Host Definition customization panel. If the Multi-Host Definition panel is not used or the Host Descriptor field on that panel is left blank, then "3270 host" is displayed in the Host Descriptor field of this panel.

HG: The hardware group of the adapter through which the host is attached to the controller.

Attach: The type of network attachment used to connect this host to the controller.

Connection Status: Status code showing the condition of the host connection and the message indicating whether that host is up (connected) or down (not connected). Several factors affect the way this is represented on the panel:

If the Attach field displays Ethernet, T/R, L-SNA, SDLC, X.25, or X21SW, and the PU is active, then UP appears on the panel. If the PU is not active, ? appears instead.

If Attach displays L-NSNA and the channel switch is in the Online position, UP appears on the panel. If the channel switch is in the Offline position, DOWN appears on the panel.

If Attach contains BSC and the Connection Status field displays 500-01, then UP appears on the panel. In any other case, DOWN appears instead.

If Attach contains DLUS, the Connection Status field displays ACTIVE or INACTIVE (SSCP-PU session state).

Configuration B/C Online Tests

Test 16 Configuration C (Only): ISDN Adapter Tests

This test is available from 1TEST only. Test 16 provides a test facility to check the status of the ISDN Adapter, to check the host status, and to port wrap test the ISDN Adapter.

1. Press and hold **ALT**; press **TEST**.
2. Type in **/16**
3. Press **Enter**; the ISDN Adapter Tests Menu is displayed.
4. Type in the option number.
5. Press **Enter**.

Figure 2-99 shows an example of the ISDN Adapter Tests menu.

_____ ISDN Adapter Tests _____	
Option	Description
1	Display Adapter Status Summary
2,h	Display Host Status Summary for host ID h
3,m,n,c	Display performance counters port m, HG n, channel c
4,m,n,c	Display error counters for port m, HG n, channel c
5,m,n,c	Change error thresholds for port m, HG n, channel c
6,m,n	Wrap port m on HG n

NOTES:

- Option 5 and 6 may require a password.
- Option 6 requires a wrap plug on requested ports.

m=0-3 n=36-39 c=D,B1,B2 h=1A-1H

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

PF: 3=Quit 12=Test Menu

Figure 2-99. Test 16: ISDN Adapter Tests Menu

Test 16, Option 1: Provides a Status Summary panel for the ISDN Adapter and ports. Figure 2-100 shows an example of the panel.

ISDN Adapter Status Summary				
Port Address	HG 36 0 1 2 3	HG 37 0 1 2 3	HG 38 0 1 2 3	HG 39 0 1 2 3
Status:	+ + + +	+ + - -	(Disabled)	(Not present)
D:	1 1 1 1	1 1 0 0		
B1:	b i i b	i b i i		
B2:	b i b i	b b i i		

- = disabled 0 = not connected b = in use
 + = enabled 1 = connected i = not in use

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

PF: 3=Quit 12=Test Menu

Figure 2-100. Example of an ISDN Adapter Status Summary Panel

Port Address: Shows the adapter port number (0–3) for a particular HG. From two to four HGs may be displayed, depending on the model of the 3174.

Status: Shows the state of the adapter and the port at the time the status summary was requested.

Not present The ISDN Adapter for this HG is not installed in the controller.

Disabled The ISDN Adapter for this HG is disabled; either it has not been configured or it is defective.

- The port is in the disabled state and is unusable.

+ The port is enabled and is in use or can be used.

D: Shows the state of the D channel on the ISDN Adapter port.

0 No logical connection has been established from the port to the ISDN Network.

1 A logical connection from the port to the ISDN Network has been established.

B1 and B2: Shows the state of the B1 and B2 channels on the ISDN Adapter port.

b The channel is currently in use.

i The channel is not currently in use.

Configuration B/C Online Tests

Test 16, Option 2,h: Displays the number of customized links and the host address range for the specified host. For each customized link, the host address, the host link status, and the PUID assigned to the link are displayed. If the link is active and an ISDN call is in process, the hardware group and port number of the ISDN Adapter carrying the call are displayed; the calling party number is displayed if it is available. Figure 2-101 shows an example of the ISDN Gateway Host Status Summary displayed when selecting Option 2 for host ID 1A. Possible Host IDs are 1A–1H. The selected host ID appears in the title line.

```
_____ ISDN Gateway Host 1A Status Summary _____  
  
Customized Links - 10                      Address Range - 31 - 3A  
  
Host Link PUID HG_PN Channel Calling Party Number  
Addr Status  
31 00 00001  
32 02 00002 37_1 B1 0123456789012345678901234567890123456789  
33 00 00003  
34 02 00004 36_3 B1 Not available from network  
35 00 00005  
36 02 00006 36_3 B2 Not available from network  
37 00 00007  
38 02 00008 38_2 B1 1234567890123456789012345678901  
  
Link Status Codes:  
00 = The ISDN attached physical unit is in disconnect mode  
02 = The ISDN attached physical unit is connected  
  
To go directly to other tests, enter: /Test,Option  
Select Test; press ENTER ==>  
  
PF: 3=Quit 5=Refresh 8=Forward 12=Test Menu
```

Figure 2-101. Example of an ISDN Gateway Host 1A Status Summary Panel

PF5 allows you to refresh the panel and display the updated information.

The panel shown applies to a channel-attached controller, such as a Model 11L. The Link Status Codes are different for a remote model. See “Link Status” on page 2-261 for a description of the link status for both channel-attached and remote models.

Customized Links: Displays the number of links declared for the selected host ID during customization. This field reflects the host links for the customized ISDN DSPUs; it does not include the host link for the local controller.

Address Range: Displays the range of host addresses for the ISDN DSPUs declared during customization for the specified host ID. This field does not include the host link for the local controller.

Host Address: The address assigned each host link during customization. This field does not include the host link for the local controller.

Link Status: Displays the two-digit status code representing the status of the link:

For Models 11L, 12L, 21H, 21L, and 22L:

00 = The ISDN-attached physical unit is in disconnect mode
02 = The ISDN-attached physical unit is connected.

For Models 11R, 12R, 21R, 61R, and 62R:

00 = SNRM required
01 = SNRM received
02 = Connected/active
03 = Poll timeout.

PUID: Displays the PUID assigned to each host link during customization. An ISDN DSPU provides a PUID to the ISDN Gateway in an XID exchange to gain access to the corresponding host link. If this field contains underscores for a particular host link, a PUID was not declared during customization for that host link. Without a customized PUID, the host link cannot be used.

The next three headings on the panel, **HG_PN**, **Channel**, and **Calling Party Number**, are valid only for the duration of a call placed from this DSPU to access the host link. These fields are not displayed unless the ISDN-attached physical unit is connected or in the process of being connected.

HG_PN: Displays the HG and PN of the ISDN Adapter carrying the call. Valid HGs are:

36–37 for Models 61R and 62R
36–38 for Models 1L, 1R, and 2R
36–39 for Models 11L, 11R, 12L, 12R, 21H, 21L, and 22L.

Channel: The B channel of the ISDN call. The valid channels are B1 and B2.

Calling Party Number: The number of the ISDN DSPU making the call; if it appears, it is provided by the ISDN. If it is not provided, the message Not available from network is displayed.

Test 16, Option 3,m,n,c: Displays and retrieves the performance counters for Hardware Groups (HG) and Port Numbers (PN) on the B and D channels.

- If a hardware group and port number are specified but no channel or a B channel is specified, the performance counters for channels B1, B2, and D for that HG and PN are displayed.
- If a D channel is specified, then the performance counters for only the D channel for the selected HG and PN are displayed.

Figure 2-102 on page 2-262 is an example of the panel that shows the performance counters for port number m, hardware group n, and channel c (m=0–3, n=36–39, c=D,B1,B2.)

Configuration B/C Online Tests

Performance Counters for PN 03, HG 36, CH D

	Counter Switch	Counter	Counter Offset	Counter Compare
Layer 1				
Errored Seconds	OFF	00000	65535	65535
Severely Errored Seconds	OFF	00000	65535	65535
Collision Detect	OFF	00000	65535	65535
Layer 2				
Total Frames Xmitd	OFF	00020	65535	65535
Total Frames Recvd	OFF	00020	65535	65535
Total Bytes Xmitd	OFF	00120	65535	65535
Total Bytes Rexmitd	OFF	00000	65535	65535
Total Bytes Recvd	OFF	00120	65535	65535
Layer 3				
Total Incoming Calls	OFF	00000	65535	65535
Incoming Calls Rejected	OFF	00000	65535	65535

To go directly to other tests, enter: /Test,Option

Select Test; press ENTER ==>

PF: 3=Quit 12=Test Menu

Figure 2-102. Example of an ISDN Performance Counter Display Panel

Layer 1, Layer 2, and Layer 3: These three layers correspond to the lowest three layers of the OSI protocol model. The Layer 1 counters count events that occur in the lowest or physical layer of the model. The Layer 2 counters count events occurring in the data link control layer. Layer 3 counters track the Q.931 layer, thereby tracking the overall call processing activity for the port.

Counter Switch: Value of the counter switch shows whether a Common Management Information Protocol (CMIP) event report is sent on the SSCP-PU session when the counter reaches its count compare value. A value of **on** shows that a report is sent if the host is customized in the 3174 to receive alert/CMIP data. For more information about CMIP event reporting, see the *3174 Customer Problem Determination* and the *3174 Functional Description*.

Counter: The total value of the number of events that have occurred.

Counter Compare: This is the threshold value for the counter. When the counter reaches this value, if the counter switch is on, then an entry containing the current values of the counter set is made in the 3174 error log and a CMIP event report of the counter set is sent to NetView. If the counter is an error counter, then an alert is also sent inbound.

When the counter reaches the counter compare value, the counter compare value is updated for the next interval by setting it to the value of the counter plus the counter offset. Thus the counter compare value is incremented through time as the counter value increases. The smaller the counter offset value, if the counter switch is on, the more often an error log will be recorded and a CMIP event report sent.

Counter Offset: When the counter value reaches the counter compare value, the counter offset is used to update the counter compare value for the next interval. Updating the counter offset value using Test 16, Option 5, causes the counter compare value to change.

Layer 1:

Errored Seconds: The number of seconds in which at least one transmission error has occurred.

Severely Errored Seconds: The number of seconds in which at least three transmission errors have occurred.

Collision Detect: The number of unsuccessful signaling attempts by the Terminal Equipment (TE), on a shared access medium. The 3174 functions as a TE.

Layer 2:

Total Frames Xmitd: The sum of the number of Information frames, Unnumbered Information frames, and Supervisory frames transmitted.

Total Frames Recvd: The sum of the number of Information frames, Unnumbered Information frames, and Supervisory frames received.

Total Bytes Xmitd: The total number of bytes transmitted by Layer 2.

Total Bytes Rexmitd: The total number of bytes retransmitted by Layer 2 because of transmission errors.

Total Bytes Recvd: The total number of bytes received by Layer 2.

Layer 3:

Total Incoming Calls: The number of incoming call attempts, successful and unsuccessful. An incoming call is coming from the DSPU to the controller.

Incoming Calls Rejected: The number of incoming calls rejected by the controller.

Configuration B/C Online Tests

Test 16, Option 4,m,n,c: This option is identical to option 3 except that error counters are obtained and displayed. Figure 2-103 is an example of the panel that shows the Error Counters for port number m, hardware group n, and channel c for Layer 1 (m=0-3, n=36-39, c=D,B1,B2.)

_____ Error Counters for PN 01, HG 37, CH D _____				
Layer 1	Counter Switch	Counter	Counter Offset	Counter Compare
Loss of Frame Alignment	ON	00000	00090	00090
Local End Code Violations	ON	00000	00090	00090
Dtctd Acc Xmit Error- In	ON	00000	00090	00090
Dtctd Acc Xmit Error- Out	ON	00000	00090	00090
Far End Code Violations	ON	00000	00090	00090

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

PF: 3=Quit 5=Refresh 8=Fwd 12=Test Menu

Figure 2-103. Example of an ISDN Error Counter Display Panel for Layer 1

Pressing PF5 allows you to refresh the panel and display any information that has changed. Pressing PF8 allows you to page forward to the next screen but does not refresh the panel. From the next panel, pressing PF7 allows you to page back to this panel but does not refresh.

See "Test 16, Option 3,m,n,c" on page 2-261 for descriptions of the column headings.

Layer 1:

Loss of Frame Alignment: The number of times that the hardware has lost physical layer frame synchronization.

Local End Code Violations: The number of unexpected line code violations that were detected at the Terminal Equipment's (TE) receiver. The 3174 controller functions as a TE.

Dtctd Acc Xmit Error - In: Detected Access Transmission System Errors-In: the number of Cyclic Redundancy Check (CRC) errors detected by the Network Termination 1 (NT1) in physical layer frames received from the network.

Dtctd Acc Xmit Error - Out: Detected Access Transmission System Errors-Out: the number of Cyclic Redundancy Check (CRC) errors in physical layer frames transmitted by the Network Termination 1 (NT1) to the network.

Far End Code Violations: The number of unexpected line code violations that were transmitted by the Terminal Equipment (TE) and detected by the ISDN Network Termination 1's (NT1) receiver. The 3174 controller functions as the TE.

Figure 2-104 on page 2-265 is an example of a second panel that is displayed for this test option showing the values for Layer 2 link and station counters.

Error Counters for PN 01, HG 38, CH B2				
Layer 2	Counter Switch	Counter	Counter Offset	Counter Compare
Link				
CRC Errors Recvd	ON	00000	00504	00504
Short Frames Recvd	ON	00000	00280	00280
Buffer Overrun	OFF	00000	00090	00090
Buffer Underrun	OFF	00000	00090	00090
Aborted Frames Recvd	OFF	00000	65535	65535
Aborted Frames Xmitted	OFF	00000	65535	65535
Unbounded Frames Recvd	OFF	00000	65535	65535
Non-Integral Frames Recvd	OFF	00000	65535	65535
Misaddressed Frames Recvd	OFF	00000	65535	65535
Station				
Frames Retransmitted	ON	00000	00576	00576
Receive Sequence Errors	ON	00000	00072	00072

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

PF: 3=Quit 5=Refresh 7=Back 12=Test Menu

Figure 2-104. Example of an ISDN Error Counter Display Panel for Layer 2

See "Test 16, Option 3,m,n,c" on page 2-261 for descriptions of the column headings.

Layer 2:

Layer 2 Link Counters: Layer 2 link counters track activity and performance of Layer 2.

CRC Errors Recvd: The number of received frames containing a CRC error.

Short Frames Recvd: The number of short frames received.

Buffer Overrun: The number of attempts made to write to a receive line buffer when it is full.

Buffer Underrun: The number of attempts made to read from a transmit line buffer when it is empty.

Aborted Frames Recvd: The number of incomplete Data Link Control (DLC) frames received.

Aborted Frames Xmitted: The number of incomplete Data Link Control (DLC) frames transmitted.

Unbounded Frames Recvd: The number of frames received that are not correctly bounded by starting or ending delimiters.

Non-Integral Frames Recvd: The number of frames received that are not composed of an integral number of octets before zero bit insertion or following zero bit extraction by Layer 2.

Misaddressed Frames Recvd: The number of frames received correctly, but for which no active station exists; therefore, these frames cannot be routed.

Configuration B/C Online Tests

Layer 2 Station Counters: Layer 2 Station Counters track activity and performance of each link station.

Frames Retransmitted: The number of protocol data units retransmitted because of timeout on the link or any other protocol errors, such as sequence errors.

Receive Sequence Errors: The number of received frames containing sequence errors. Sequence errors can be detected only in frames that contain send or receive counts; such frames are Information (I) frames, and Supervisor (S) frames: RR, RNR, and REJ.

Test 16, Option 5,m,n,c: From this panel, error counter offsets can be changed and error counter switches can be activated or deactivated. Figure 2-105 is an example of the panel that shows the Error Threshold Counters for port number m, hardware group n, and channel c for Layer 1 (m=0-3, n=36-39, c=D,B1,B2). Figure 2-106 on page 2-267 is an example of a second panel that is displayed for this test option showing the values for Layer 2.

You can change the values of the error counter switch and the error counter offset for the fields on these panels, provided you have a password (set up in configuration question 98) to authorize you to change these values. Changing these counters does not interrupt the session on the port.

See "Test 16, Option 3,m,n,c" on page 2-261 for a description of the headings of the columns; see "Test 16, Option 4,m,n,c" on page 2-264 for a description of the fields.

_____ Counters for PN 02, HG 39, CH B2 _____				
Layer 1	Current Value		Update Value	
	Counter Switch	Counter Offset	Counter Switch	Counter Offset
Loss of Frame Alignment	ON	00090		
Local End Code Violations	ON	00090		
Dtctd Acc Xmit Error - In	ON	00090		
Dtctd Acc Xmit Error - Out	ON	00090		
Far End Code Violations	ON	00090		

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

PF: 3=Quit 4=Save 5=Refresh 8=Fwd 9=Verify 12=Test Menu

Figure 2-105. Example of an ISDN Error Threshold Counter Change Panel for Layer 1

Counters for PN 02, HG 39, CH B2				
Layer 2	Current	Value	Update	Value
	Counter	Counter	Counter	Counter
	Switch	Offset	Switch	Offset
Link				
CRC Errors Recvd	ON	00504		
Short Frames Recvd	ON	00280		
Buffer Overrun	OFF	00090		
Buffer Underrun	OFF	00090		
Aborted Frames Recvd	OFF	65535		
Aborted Frames Xmitted	OFF	65535		
Unbounded Frames Recvd	OFF	65535		
Non-Integral Frames Recvd	OFF	65535		
Misaddressed Frames Recvd	OFF	65535		
Station				
Frames Retransmitted	ON	00576		
Receive Sequence Errors	ON	00072		

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

PF: 3=Quit 4=Save 5=Refresh 7=Back 9=Verify 12=Test Menu

Figure 2-106. Example of an ISDN Error Threshold Counter Change Panel for Layer 2

PF Keys for These Panels: Pressing PF5 refreshes the panel and prepares the panel for further input. Pressing PF4 verifies and saves the changes entered. The changes become effective when PF4 is pressed, but are not displayed until PF5 is pressed. No further changes can be entered after pressing PF4 until PF5 is pressed.

Pressing PF4 causes PF4 and PF9 to disappear from the panel. These keys are restored and the panel is ready for further updating when PF5 is pressed.

PF7 and PF8 are also affected by pressing PF4. If you press PF4 on the first panel and then advance to the second panel by pressing PF8, PF7 is not displayed on the second panel. PF7 reappears when PF5 is pressed. If you press PF4 on the second panel but have not pressed it on the first panel, when you return to the first panel using PF7, PF8 is not displayed on the first panel. Pressing PF5 restores PF8 on the first panel.

These features of the PF keys require you to press PF5 after pressing PF4, so that a second update can be made only after the refresh has taken place.

Input Values: You may enter **on** or **off** as values for the counter switch and a number between 0–65535 for the counter offset. To update, type any changes in the space under the appropriate heading on the right side of the screen and press PF4.

Updating the counter offset value allows you to increase the frequency of error log entries and CMIP event reports. When the counter value reaches the current counter compare value, the counter compare value is updated for the next interval by setting it to the value of the counter plus the counter offset. Thus the counter compare value is incremented through time as the counter value increases. The smaller the counter offset value, the smaller the counter compare value and the more often the counter value will equal the counter compare value. Whenever the counter value and the counter compare value are equal, if the counter switch is on, an error is logged and a CMIP event report is sent.

Configuration B/C Online Tests

Updating the counter offset will cause a wrap condition that will be logged in the 3174 error log and reported to NetView by a CMIP event report. For more information about the counter set and the wrap condition, see the *3174 Functional Description*.

- | **Test 16, Option 6,m,n:** This option allows a port to be wrap tested and requires the ISDN Adapter
- | Wrap Plug (P/N 74F4409). If the designated port is in use at the time of the test request, the password
- | (entered for configuration question 98) must be provided. The session for this port is disrupted when the
- | password is entered. If this test runs successfully, the results are displayed on line 23 of the panel within
- | 10 seconds.

Test 17 Configuration C (Only): Advanced Peer-to-Peer Networking (APPN) Tests

This test is available from 1TEST only. Test 17 provides information for APPN. It allows you to view status information for the current network node (3174), links, and sessions. You can also view information for adjacent nodes, pending session routes, and active locate requests. To invoke the test menu shown in Figure 2-107, perform the following procedure at any 3278 or similar display station:

1. Press and hold **ALT**; press **TEST**.
2. Type in **/17**
3. Press **Enter**; the APPN Test Menu is displayed.
4. Type in the option number.
5. Press **Enter**.

_____ APPN Test Menu _____	
Option	Description
1	Display Node Status
2	Display Adjacent Nodes
3,N.C	Display Link Status (N.C = NETID.CPNAME)
4(,x)	Display Session Status (x = Status Type; P=Pending, A=Active, T=Terminating)
5,P.N.C	Display Pending Session Route (P.N.C = PCID.NETID.CPNAME)
6	Display Active Locate Requests
7	Display Local LU 6.2 Session Status

NOTE: The Link Status Test can also be run by executing the Adjacent Nodes Test and selecting a Link ID.
The Pending Session Route Test can also be run by executing the Session Status Test and selecting a Session Number.
PCID, NETID, and CPNAME parameters are case sensitive.

To go directly to other tests, enter: /Test,Option
Select option; Press ENTER ==>

PF: 3=Quit 12=Test menu

Figure 2-107. Test 17: APPN Test Menu

Test 17, Option 1: This option displays information about the network node (3174). It provides data such as node identification, link and session information, and node status.

Figure 2-108 on page 2-269 shows an example of the Node Status panel.


```

                _____ Node Status _____
NETID: NETA      CPNAME: NODE1      Type: NN      Max Links: 150

Adjacent End/LEN Nodes
Customized: 5      Active: 3
Adjacent Network Nodes
Customized: 2      Active: 1

Max Intrmed Sessions: 500      Active Intrmed Sessions: 4

Registered Entries: 10      Home Entries: 4

Cache Entries: 2      Rte Add Res: 128

Pool Buffer Usage: 20 %      Congestion: NO

Data Buffer Usage: 30 %      Session Resource Depletion: NO

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

PF: 3=Quit 5=Refresh 12=Test menu
    
```

Figure 2-108. Example of a Node Status Panel

Note: PF5 allows you to refresh the panel and display the updated information.

NETID: Identifies the network where this node resides.

CPNAME: Identifies the Control Point name of the node.

Type: Identifies the type of node as a network node (NN).

Max Links: Shows the maximum number of APPN links to other nodes supported at one time (set in configuration question 611).

Adjacent End/LEN Nodes Customized: Shows the number of APPN and low-entry networking (LEN) End nodes declared during customization.

Active: Shows the number of APPN and LEN End nodes that are currently in link activation, active, or in link deactivation.

Adjacent Network Nodes Customized: Shows the number of network nodes declared in customization.

Active: Shows the number of network nodes currently in link activation, active, or in link deactivation.

Max Intrmed Sessions: Shows the maximum number of sessions, with destination and origin LUs located outside the 3174, that can be routed through the 3174 network node at one time (set in configuration question 610).

Active Intrmed Sessions: Shows the number of intermediate sessions currently active in this node.

Registered Entries: Shows the number of resource entries residing in attached end nodes that were registered after link activation.

Configuration B/C Online Tests

Home Entries: Shows the number of resource entries that were customized and reside in this node or in attached LEN End nodes.

Cache Entries: Shows the number of resource entries in the directory that were customized and reside in another network node or were registered through a locate request or another non-customized LEN End node.

Rte Add Res: Shows the Route Addition Resistance for this node.

Pool Buffer Usage: The percentage of APPN buffers (excluding data buffers) currently in use.

Data Buffer Usage: The percentage of APPN data buffers currently in use.

Congestion: Shows if the 3174 is over-using the buffers or cycles.

Session Resource Depletion: Shows there are no more resources available for session activation.

Test 17, Option 2: This option allows you to display ID information for the nodes adjacent to the current node. You can obtain detailed information for the link by typing a Link ID and pressing Enter. The Link Status Test (Option 3) then runs if the Link ID was valid. If the Link ID was not valid, an error message appears.

Figure 2-109 shows an example of the Adjacent Nodes panel.

Adjacent Nodes							
LINKID	NETID	CPNAME	Type	Status	State	Num Sess	CP-CP
1	NETA	HOST1	WC	CLOSED	01	0	NA
5	NETA	SUBNODE	SN	CONN	05	0	NA
10	NETA	LENA	LN	OPEN	08	2	NA
12	NETA	NETNODE	NN	OPEN	08	2	YES
15	NETA	ENNODE	EN	DISCON	09	0	NO

To go directly to other tests, enter: /Test,Option
Select test; Press ENTER ==>
4729-Enter the LINKID to run Link Status Test
PF: 3=Quit 5=Refresh 7=Backward 8=Forward 12=Test menu

Figure 2-109. Example of a Adjacent Nodes Panel

Note: The 4729 message is always present on the panel.

Option 2 provides general identification and status information on each adjacent node. Up to 15 adjacent nodes are displayed per page. If there are more than 15 nodes, press PF8 to page forward to the

additional data. Press PF7 to page back to the previous panel. Press PF5 to refresh the panel and display the updated information.

Pressing PF5 refreshes all the values for all the nodes. However, when you press PF5, you will remain on the current panel. The first node displayed on the panel after the refresh is the same node displayed before the refresh, unless that node is no longer displayed. The other nodes displayed are the 14 sequentially numbered nodes that come behind it.

If the node that was the first node on the panel before the refresh is no longer displayed, the first node shown on the panel will be the next node in sequential order behind the first node from the old panel. For example, if the first node on the panel before it was refreshed was LINKID 12 and the second node was LINKID 14, if LINKID 12 is no longer displayed, but LINKID 14 is displayed, then LINKID 14 becomes the first node on the refreshed panel.

LINKID: An identification number used to select a specific node for the Link Status Test.

NETID: Identifies the network where the adjacent node resides.

CPNAME: Identifies the Control Point name of the adjacent node.

Type: Identifies the type of adjacent node as one of the following:

NN Network Node

EN End Node

LN LEN End Node

SN Subarea Node

WC A Subarea Node for which this node has the Wildcard option.

Status: Shows the current APPN status of the link connecting the adjacent node with this node. Valid values are:

Status	Description
CLOSED	= Link is closed
CONN	= Link establishment is in progress
OPEN	= Link is open
DISCON	= Link deactivation is in progress
DWNGRD	= Shared link is open but downgraded (2.0 link only)

State: Shows a finite state machine value representing the current state of the link connecting the adjacent node with this node. Valid values are:

State	Description
01	= Link Closed
02	= Activating Port
04	= Open Station Sent
05	= Performing XID Exchange
06	= Activating Address Space
07	= Set Mode Sent
08	= Link Open
09	= Deactivating Address Space
0A	= Close Station Sent

Num Sess: Shows the number of intermediate sessions on the link currently pending activation, active, or pending termination.

Configuration B/C Online Tests

CP-CP: Shows if CP-CP sessions are active on the link. Valid values are:

CP-CP Description

YES Both CP-CP sessions are currently active
 NO Both CP-CP sessions are not currently active
 CNW The conwinner CP session is currently active on this link
 CNL The conloser CP session is currently active on this link
 NA CP-CP session is not currently active on this link because the adjacent node is not an APPN node or the link is closed.

Test 17, Option 3: This option displays the detailed status of a specific link. You can specify a particular link when invoking the panel from the APPN Test Menu or from Option 2, Adjacent Nodes.

There are two ways to invoke this option:

- From the APPN Test Menu, type **3,NETID.CPNAME**, and then press **Enter**.
 where:
 NETID identifies the network in which the adjacent node resides.
 CPNAME identifies the Control Point Name of the adjacent node.
- From the Adjacent Nodes Test (/17,2) type a LINKID on the command line, and then press **Enter**.

Figure 2-110 shows an example of the Link Status panel.

Link Status					
NETID	CPNAME	Type	Status	State	Route Addition Resistance
NETA	NETNODE	NN	OPEN	08	128
RCV Slam	SND Slam	Combined PU 2.0	Number APPN Sess	Congestion	Session Resource Depletion
NO	NO	YES	2	NO	NO
Adapter Type	Local Address	TG	HG	Remote Address	Product Information
TR	400000000001	01	31	40000000000904	317413R

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

PF: 3=Quit 5=Refresh 7=Backward 8=Forward 12=Test menu

Figure 2-110. Example of a Link Status Panel

Notes:

1. Press PF5 to refresh the Link Status panel and display the updated information for the currently displayed link.
2. If the Link Status option is invoked from the APPN Test Menu (by typing 3,NETID.CPNAME), there will be a Link Status panel displayed for each link to the specified NETID.CPNAME. Press PF8 to page forward to the next panel and PF7 to page back to the previous panel.

NETID: Identifies the network in which the adjacent node resides.

CPNAME: Identifies the Control Point Name of the adjacent node.

Type: Identifies the type of adjacent node. Valid types are:

- NN** Network Node
- EN** End Node
- LN** LEN End Node
- SN** Subarea Node
- WC** A Subarea Node for which this node has the Wildcard option.

Status: Shows the current APPN status of the link connecting the adjacent node with this node. Valid values are:

Status	Description
CLOSED	= Link is closed
CONN	= Link establishment is in progress
OPEN	= Link is open
DISCON	= Link deactivation is in progress

State: Shows a finite state machine value representing the current state of the link connecting the adjacent node with this node. Valid values are:

State	Description
01	= Link Closed
02	= Activating Port
04	= Open Station Sent
05	= Performing XID Exchange
06	= Activating Address Space
07	= Set Mode Sent
08	= Link Open
09	= Deactivating Address Space
0A	= Close Station Sent

Route Addition Resistance: Shows the Route Addition Resistance for this node.

RCV Slam: Flags a session establishment slam by the 3174, which shows that the 3174 cannot receive any more bind sessions. Valid values are YES, NO, and NA, where NA denotes that the link is closed or bind pacing is not supported.

SND Slam: Flags a session establishment slam by the adjacent node indicating that the 3174 should send no more bind sessions because the adjacent node cannot receive them. Valid values are YES, NO, and NA, where NA denotes that the link is closed or bind pacing is not supported.

Combined PU 2.0: Shows if the link carries T2.0 and T2.1 traffic or only T2.1.

Configuration B/C Online Tests

Number APPN Sess: Shows the number of intermediate sessions on this link currently pending activation, active, or pending termination

Congestion: Shows if the adjacent node is over-using the buffers or cycles.

Session Resource Depletion: Shows there are no more resources available in the adjacent node for session activation.

Adapter Type: Identifies the type of adapter connecting the 3174 to the other node. Valid values are:

- | ENET (Ethernet)
- | TR (Token-Ring)
- | TP (SDLC, X.25, or frame relay)
- | CHANNEL

Local Address: Identifies the address of the controller on this link

- | • Ethernet address for Ethernet links
- | • Token-ring address for token-ring links
- | • Frame relay local SAP
- | • Customized address (as defined in configuration question 104) for TP and Channel.

TG: Shows the Transmission Group number used on this link.

HG: Shows the Hardware Group of the adapter.

- | **Remote Address:** Shows the LAN address of the adjacent node for LAN links. Shows the DLCI and
- | remote SAP for frame relay links.

Product Information: Identifying information about the product on the other end of the link.

Test 17, Option 4: This option displays information for all intermediate sessions or for selected sessions only. If you do not specify a parameter, information for all sessions is displayed.

If you do specify a parameter, you can control the type of session information. The parameters are:

- p** pending
- a** active
- t** terminating.

Pending sessions (status on the panel is PEND) have a further test. To obtain detailed information for these sessions, type a session number (from the Num field) and press **Enter**. The Pending Session Route Test then runs if the session is valid. If the session is not valid, an error message appears. See "Test 17, Option 5" on page 2-276 for more information about the Pending Session Route test.

Figure 2-111 on page 2-275 shows an example of the Session Status panel.

Session Status							
Num	PCID	NETID	CPNAME	Status	ST	OLU	DLU
03	1A223B445CC678D9	NETA	NODE1	PEND	04	LENLU1	ENLU2
06	234A812B345C123A	NETA	EN2	ACTIVE	00	ENLU1	LENLU2
08	51432DCA69873214	NETA	NODE1	TERM	07	ENLU1	LENLU2

To go directly to other tests, enter: /Test,Option
 Select test; Press ENTER ==>
 4730-Enter the Num to run the Pending Session Route Test
 PF: 3=Quit 5=Refresh 7=Backward 8=Forward 12=Test menu

Figure 2-111. Example of a Session Status Panel

Information for up to 15 sessions appears on each panel. If there are additional sessions, press the PF8 key to page forward to the next panel. Press PF7 to page back to the previous panel. Press PF5 to refresh the Session Status panel and display the updated information.

Num: A number used to select a specific session for the Pending Session Route Test.

PCID: A unique identifier assigned to the session by the origin node.

NETID: Identifies the network of the node originating the bind request.

CPNAME: Identifies the Control Point name of the node originating the bind request.

Status: Shows the current status of the session. Valid values are:

Status	Description
PEND	Session Pending Activation
ACTIVE	Session Active
TERM	Session Pending Termination

ST: Shows a finite state machine value representing the current state of the session. Valid values are:

State	Description
00	= Session Operating Normally
01	= Reset
02	= Pending CINIT (Locating Destination LU)
03	= Initialization Terminated
04	= Pending BIND Response
06	= Pending UNBIND Response - Secondary
07	= Pending UNBIND Response - Primary
08	= Pending UNBIND Response

Configuration B/C Online Tests

OLU: Specifies the name of the originating logical unit of the session.

DLU: Specifies the name of the destination logical unit of the session.

Test 17, Option 5: This option specifies the route that a selected pending session travels to get through the network. It is available only on sessions in which the node is waiting for a bind response (sessions in PEND status). Each "stop" the session makes is recorded as a hop.

There are two ways to invoke the option:

- From the APPN Test Menu, type **5,PCID.NETID.CPNAME**, and then press **Enter**.
I where:
I PCID is a unique identifier assigned to the session by the origin node
I NETID identifies the network of the originating node of the specified hop
I CPNAME identifies the Control Point name of the originating node of the specified hop
- From the Session Status Test (/17,4), type the session number of the desired entry on the command line and then press **Enter**.

If the session is not in PEND status, an error message is displayed.

Figure 2-112 shows an example of the Pending Session Route panel.

Pending Session Route				
Hop	From NETID	From CPNAME	To NETID	To CPNAME
1	NETA	NODE1	NETA	NETNODE
2	NETA	NETNODE	NETA	EN2

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

PF: 3=Quit 7=Backward 8=Forward 12=Test menu

Figure 2-112. Example of a Pending Session Route Panel

Up to 15 hops can appear on a panel. Press PF8 to page forward to the next panel. Press PF7 to page back to the previous panel.

Hop: Shows the hop number of the current step in the route.

From NETID: Identifies the network of the originating node of the specified hop.

From CPNAME: Identifies the Control Point name of the originating node of the specified hop.

To NETID: Identifies the network of the destination node of the specified hop.

To CPNAME: Identifies the Control Point name of the destination node of the specified hop.

Test 17, Option 6: This option displays information on all of the locate requests currently active in the node. It provides such data as identification of the request and of the node that sent the request.

Figure 2-113 shows an example of the Active Locate Requests panel.

Active Locate Requests				
FQPCID	N	RCVD From	Out	LUNAME
123456789ABCDEF0.NETA.NODE1	1		1	ENLU3

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

PF: 3=Quit 5=Refresh 7=Backward 8=Forward 12=Test menu

Figure 2-113. Active Locate Requests Panel

Up to 15 locates can be displayed on each panel. If there are more than 15 locates, press PF8 to page forward to the next panel. Press PF7 to page back to the previous panel. Press PF5 to refresh the Active Locate Requests panel and display the updated information.

FQPCID: A fully qualified ID the originating node assigns to the Locate request. It consists of a PCID, NETID, and CPNAME. The PCID is the unique identifier assigned by the origin node.

N: The sequence number assigned to the Locate.

RCVD From: Identifies the CPNAME of the node that sent the Locate request (blank if the 3174 was the originating node).

Out: Shows the number of outstanding requests against the specified Locate.

LUNAME: Specifies the name of the LU being located.

Note: If the NETID in the FQPCID, the NETID of the node in the RCVD From field, and the NETID of the LU being located are the same, the panel entry is one line long. Otherwise, for each field that differs from

Configuration B/C Online Tests

the FQPCID NETID, the NETID is listed above the CPNAME of the node or the LUNAME (depending on the field) and the entry is two lines long.

Test 17, Option 7: This option displays the independent session status of all LU 6.2 sessions that have an endpoint in the 3174. Figure 2-114 shows an example of the LU 6.2 Session Status panel.

```
|
|
|           _____ Local LU 6.2 Session Status _____
|
|   PCID          NETID   CPNAME   Status  ST  Mode      Partner LU
|   -----
|  1A223B445CC678D9  NETA   NODE1   ACTIVE  00  SNASVCMG  LENLU2
|  234A812B345C123A  NETA   EN2     PEND   04  CPSVRMGR  LENLU4
|
```

```
|
|  To go directly to other tests, enter: /Test,Option
|  Select test; Press ENTER ==>
|
|  PF: 3=Quit  5=Refresh  7=Backward  8=Forward  12=Test menu
|
```

Figure 2-114. An Example of a Local LU 6.2 Session Status Panel

Information for up to 15 sessions appears on each panel. If there are additional sessions, press PF8 to page forward to the next panel.

PCID: A unique identifier assigned to the session by the origin node.

NETID: Identifies the network of the node originating the bind request.

CPNAME: Identifies the Control Point name of the node originating the bind request.

Status: Shows the current status of the session. Valid values are:

Status	Description
PEND	Session pending activation
ACTIVE	Session active
TERM	Session pending termination

ST: Shows a finite state machine value representing the current state of the session. Valid values are:

State	Description
00	= Reset
01	= Pending BIND response
02	= Session operating normally
03	= Pending UNBIND response
04	= Pending CINIT (Locating Destination LU)

| **Mode:** Specifies the SNA defined mode name as received in the BIND. Valid values are:

Mode	Description
SNASVCMG	Used for CNOS and management services sessions
CPSVCMG	Used for CP-CP sessions
CPSVRMGR	Used for DLUS/DLUR sessions
BATCH	Used for 3174 dependent LU sessions
#BATCH	Used for batch-oriented class of service that uses low transmission priority
USER	The user-specified mode name used for this session

| **Partner LU:** Specifies the name of the logical unit in session with the 3174 control point.

| **Test 18 Configuration C (Only): Frame Relay Tests**

| This test is available from 1TEST only.

| Test 18 displays port summary and status information and provides update capability for the frame relay parameters. To invoke the test menu shown in Figure 2-115, perform the following procedure at any 3278 or similar display station:

- | 1. Press and hold **ALT**; press **TEST**.
- | 2. Type in **/18**.
- | 3. Press **Enter**; the Frame Relay Test Menu is displayed.
- | 4. Type in the option number.
- | 5. Press **Enter**.

```
|
|           _____ Frame Relay Test Menu _____
|
| Option   Description
| 1        Display Frame Relay port summary information
| 2,p      Update Frame Relay Parameters
| 3        List all DLCI status and protocol type
| 4,n      List specific DLCI status summary
| 5        Display link status summary
```

| p = RAS password
 | n = DLCI number (decimal)

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

| PF: 3=Quit 12=Test menu

| *Figure 2-115. Test 18: Frame Relay Test Menu*

Configuration B/C Online Tests

| **Test 18, Option 1:** This option displays frame relay Data Link Connection Management Interface (DLCMI) data and physical layer errors.

| Figure 2-116 shows an example of a Frame Relay port summary information panel.

```
|
|          ___ Display Frame Relay port summary information ___
|
| Frame Relay DLC Management interface
|   LMI Type ..... Address Format ..... 4
|   Address Length..... 2   Transmit Polling Interval ...
|   Full Status Polling Cycles. 6   Error Threshold ..... 3
|   Monitored Events ..... 4   Max Supported VCs .....
|   Multicast ..... N
|
| Physical layer errors
|   FCS Errors ..... Transmit Underrun Errors ....
|   Receive Overrun Errors ..... Aborted Frames .....
```

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

| PF: 3=Quit 12=Test menu
|

| Notes:

- | 1. LMI type values displayed will be Annex-D, Rev-1, CCITT, and None.
- | 2. All other values will be numerical (except Multicast; N=No).

| *Figure 2-116. An Example of a Frame Relay Port Summary Information Panel.*

| **Test 18, Option 2,p:** This option allows you to update the following Frame Relay parameters

- | • Transmit polling interval
- | • Committed Information Rate

| You can change the values of the parameters provided you have a password (set up in configuration question 98) to authorize you to change these values.

| **Note:** Changes made using this option are not permanent. When the 3174 is re-IMLed, the values from customization are restored.

| Figure 2-117 shows an example of the Frame Relay Parameters update panel.

Configuration B/C Online Tests

| **Test 18, Option 3:** This option displays the existing Data Link Control Identifiers (DLCIs), their status
| and data types.

| Figure 2-118 shows an example of DLCI status and data type panel.

```
|
|           _____ List all DLCI status and data types _____
|
| DLCI Number           Link Status           Data Type(s)
| Decimal / Hex / Q.922 (New/Active/   Received and
|                        Inactive)       Processed
| -----
| 0016 / 010 / 0401     New                ***Not determined yet
| 0017 / 011 / 0411     Active               IP
| 0117 / 075 / 1351     Active               SNA, IP
| 0816 / 330 / CC01     New                ***Not determined yet
|
| .
| .
| (Up to 254 DLCIs can be displayed)
| .
| .
| 1007 / 3EF / F8F1     Active               SNA
|
| Note: FECN, BECN and DE are set to zero for Q.922 DLCI display format
|
| To go directly to other tests, enter: /Test,Option
| Select test; press ENTER ***> _____
|
| PF: 3=Quit 7=Back 8=FWD 12=Test menu
|
```

| Figure 2-118. An Example of a Panel Listing Status and Data Types for All DLCIs

| **Test 18, Option 4,n:** This option displays a status summary for the Data Link Control Identifier (DLCI) specified by the decimal value *n*.

| Figure 2-119 shows an example of a specific DLCI status summary panel.

```
|
|           _____ List specific DLCI status summary _____
|
| DLCI number           ..... _____
| State ..... _____
| FECN frames received ..... _____
| BECN frames received ..... _____
| Frames sent ..... _____
| Octets sent ..... _____
| Frames received ..... _____
| Octets received ..... _____
| Circuit creation time ..... _____
| Time of last circuit state change .. _____
| Throughput ..... _____
| Committed Information Rate (CIR) ... _____
| Number of fragments received ..... _____
|
```

```
|
| To go directly to other tests, enter: /Test,Option
| Select test; press ENTER ***> _____
|
| PF: 3=Quit  12=Test menu
|
```

| **Note:** The valid value for State is NEW or ACTIVE.

| *Figure 2-119. An Example of a List-Specific DLCI Status Summary Panel*

Configuration B/C Online Tests

Test 18, Option 5: This option displays the link status counters for all links

Figure 2-120 shows an example of a link status summary panel.

```

|
|
|           _____ Link Status Summary _____
|
| Host ID/DLCI/RSAP   1A 0011 04      1B 0012 04      01C 0013 04
| Primary/Secondary   01/02           01/02           01/02
| Trans I-Frames      000000001      00000011      00000111
| Rec I-Frames        000000002      00000022      00000222
| Transmit Errors     000000003      00000033      00000333
| Received Errors     000000004      00000044      00000444
| T1 Expired          000000005      00000055      00000555
| Com/Res Ind         83 1B           83 1B           83 1B
|
| DLCI/RSAP           0114 04          0115 04          0116 04
| Primary/Secondary   01/02           01/02           01/02
| Trans I-Frames      000000001      00000011      00000111
| Rec I-Frames        000000002      00000022      00000222
| Transmit Errors     000000003      00000033      00000333
| Received Errors     000000004      00000044      00000444
| T1 Expired          000000005      00000055      00000555
| Com/Res Ind         83 1B           83 1B           83 1B
|
| To go directly to other tests, enter: /Test,Option
| Select Test; press ENTER ==> _
|
| PF: 3=Quit      7=Back      8=FWD      12=Test menu
|
|
```

Figure 2-120. Example of a Link Status Summary Panel for a 3174 Attached to an Ethernet Network and Functioning as an APPN Network Node

Host ID: The host ID for the host (possible values are 1A–1H).

DLCI: The data link connection identifier.

RSAP: Remote Service Access Point: the service access point (SAP) associated with the partner link connection.

Trans I-Frames: This counter shows the number of Information format logical link control protocol data units (LPDUs) that have been sent, including all retransmissions. The actual counter for the link is reset when the link is initialized.

Rec I-Frames: This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors: This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Received Errors: This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired: This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

| **Com/Res Ind:** The first two-digit hexadecimal value shows the last command/response received. The second two-digit hexadecimal value shows the last command/response sent.

| **Primary/Secondary:** These are the DLC primary and secondary states for the link station:

Primary State		Secondary State	
80	Link Closed	80	Checkpointing
40	Disconnected	40	Local busy (operator)
20	Disconnecting	20	Local Busy (buffer)
10	Link Opening	10	Remote Busy
08	Resetting	08	Rejection
04	Frame Reject Sent	04	Clearing Algorithm Running
02	Frame Reject Received	02	Reserved
01	Link Opened	01	Reserved

| **Note:** The primary states are mutually exclusive. The secondary states are not mutually exclusive.

| Primary States

| **80 - Link Closed:** The link closed state is entered in the following cases:

- | • A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission completes when the transmission completes.
- | • A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.

| No commands are accepted while the communication adapter is in the link closed state. All received frames are ignored.

| **40 - Disconnected:** The disconnected state is entered in the following cases:

- | • Acceptance of an Open Station SRB
- | • Receipt of a DISC command or a DM response from the paired station
- | • When the retry count has been exhausted because of time-outs.

| In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

| The following SRBs are accepted:

- | Close station SRB - Transition to link closed.
- | Connect station SRB - Transition to link opening.

| **20 - Disconnecting:** The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state is maintained until one of the following occurs:

- | • Either a UA or DM response is received to the transmitted DISC command.
- | • A SABME command is received and a DM response has been transmitted.
- | • The retry count expires.

| There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting state is to the disconnected state. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The communication adapter exits this state to the link is nonexistent or the link is closed.

Configuration B/C Online Tests

| Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

| **10 - Link Opening:** The communication adapter enters the link opening state when the controller accepts a Connect station SRB.

| **08 - Resetting:** The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The communication adapter reports receipt of the SABME command to the controller using a DLC Status ARB indicating a SABME command and the Station ID of the affected station was received. In this state, the communication adapter accepts the following SRBs:

| Close Station SRB - Transition to the disconnecting state.
| Connect Station SRB - Transition to the link opening state.

| All incoming frames are ignored except:

| DISC - Transmit UA, transition to the disconnected state.
| DM - Transition to the disconnected state.

| **04 - Frame Reject Sent:** When the communication adapter transmits a Frame Reject (FRMR) because it receives an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

| In this state, the adapter accepts the following SRBs:

| Close station SRB - Transition to the disconnecting state.
| Connect station SRB - Transition to the link opening state.

| All incoming frames except the following are ignored except that FRMR response final is transmitted in response to command polls:

| SABME - Transition to the resetting state.
| DISC - Transition to the disconnected state.
| DM - Transition to the disconnected state.
| FRMR - Transition to the FRMR received state.

| **02 - Frame Reject Received:** When the communication adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The adapter then enters the FRMR received state.

| In this state, the adapter accepts the following SRBs:

| Close station SRB - Transition to the disconnecting state.
| Connect station SRB - Transition to the link opening state.

| In this state, all frames except the following are ignored:

| SABME - Transition to the resetting state.
| DISC - Transition to the disconnected state.
| DM - Transition to the disconnected state.

| **01 - Link Opened:** The link opened state is entered from link opening after the SABME-UA exchange that completes the connection protocol. This is the only state where information transfer is allowed and where transmit SRBs are accepted. In this state, the communication adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

| If the primary state is changed from link opened, any outstanding Transmit requests are not returned.

| **Secondary States**

- | **80 - Checkpointing:** A poll is outstanding as a result of a response timeout. I-frame transmission is suspended.
- | **40 - Local Busy (User):** A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.
- | **20 - Local Busy (buffer):** An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.
- | **10 - Remote Busy:** An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.
- | **08 - Rejection:** An out of sequence I-frame has been received and an REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.
- | **04 - Clearing:** A poll is outstanding and a confirmation of clearing Local Busy is required.

General Procedures

This section describes the following procedures:

- How to perform an operator panel lamp test
- How to display the Master Menu
- How to take the 3174 Model 21L offline
- How to place the 3174 Model 21L online
- How to force the 3174 Model 21L offline (two methods)
- How to take the 3174 Model 22L offline
- How to place the 3174 Model 22L online
- How to disconnect the bus/tag interface cables
- How to switch the Model 21L power on and off
- How to perform the coaxial cable ground loop check
- How to measure the Enterprise Systems Connection Adapter Transmit and Receive Levels
- How to check for a terminal-ready condition
- How to use the 3174 patch procedure
- How to perform the 3174 dump
- How to set modem switches and modem specifications
- How to run System/370 OLTs.

How to Perform an Operator Panel Lamp Test

Performing this test causes the controller to re-IML. Notify the affected personnel before beginning the test.

To test the LEDs on the operator panel display, press and hold the **IML** pushbutton. All the LEDs should light and the status indicator should display 8888.

How to Display the Master Menu

The Master Menu (Figure 2-121 on page 2-289) lists the utilities available on the Utility disk (diskette or fixed disk). From this menu, you select the option you want.

To display the Master Menu **using the Utility diskette**:

1. Insert the Utility diskette into diskette drive 1.
2. Press and hold **Alt 1**.
3. Press and release **IML**.
4. Release Alt 1.
5. 40 is displayed.
6. Press **Enter**. The Master Menu is displayed on the terminal connected to port 0 on HG 26 of the 3174.

To display the Master Menu **using the fixed disk**:

1. Press and hold **Alt 1**.
2. Press and release **IML**.
3. Release Alt 1.
4. At 40, key in **0340** (for fixed disk).
5. Press **Enter**. The Master Menu shown in Figure 2-121 on page 2-289 is displayed on the terminal connected to port 0 on HG 26 of the 3174.

```

          _____ Master Menu _____

3174 MICROCODE © COPYRIGHT IBM CORP 1986, 1987, 1988 1989
          Licensed Internal Code - Property of IBM

Select option; press ENTER

Option  Description
  1      Customize the Control Disk
  2      Merge DSL
  3      Copy Files
  4      Diagnostics
  5      Microcode Upgrade
  6      Central Site Customizing
  7      Media Management
  K      Identify Customizing Keyboard

Select ==> _

```

Figure 2-121. Master Menu Configuration B

Following are explanations of the options shown on the Master Menu panel:

Customize the Control Disk: Customizing requires that hardware and software configuration information be either specified or modified on the Control disk that is used to make a 3174 operational. For example, defining host, device, and printer attachments, and modifiable-keyboard types. When you select this procedure, a second menu is displayed. See the *3174 Utilities Guide* for the procedure.

Merge DSL Code: DFT displays or the Asynchronous Emulation Adapter (both of which require the controller to downstream-load microcode), have a separate DSL disk. During this procedure, you merge one DSL disk onto another DSL disk. If you are using Configuration Support C, you must merge the DSL code onto the Control Extension diskette. You would then IML using the Control Extension diskette in place of the 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 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.

Central Site Customizing: Central Site Customizing allows you to tailor the 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 utility.

General Procedures

Media Management: The Media Management procedure provides a tool for managing the data resident on a disk. You can use this tool for the following tasks:

- Select which subdirectories will be used for different IML types
- Select, de-select, and delete subdirectories
- Display information about diskettes and subdirectories
- Create dump and trace diskettes.

See *3174 Utilities Guide* for details on using this 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 is 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.

Taking the 3174 Offline

How to Take the 3174 Model 21L Offline

1. Check that the offline indicator is off.

Note: If the indicator is on, the controller is already offline.

2. Contact the system operator to vary the 3174 and its attached devices offline from the host system.
3. Set the Channel Interface switch to the Offline position. Wait for the offline indicator to light.
4. If the offline indicator does not light, use the procedure "How to Force the 3174 Model 21L Offline: Alt 1 Method" on page 2-291.

How to Place the 3174 Model 21L Online

1. Check that the offline indicator is lit.
2. Set the Channel Interface switch to the Online position.
3. If the Control microcode is not on the fixed disk, insert a Control Extension diskette or Control diskette into diskette drive 1. Insert a DSL diskette into diskette drive 2 as required.
4. If power is on, press the IML pushbutton and go to step 6. If power is off, continue with step 5.
5. Set the power switch to ON. After IML is completed, the offline indicator should turn off.
6. If the offline indicator stays on, go to MAP 0900 (online symptom).
7. If a status code is displayed, go to the *3174 Status Codes* manual.
8. Contact the system operator to vary the 3174 online.

How to Force the 3174 Model 21L Offline: Alt 1 Method

This procedure resets the Channel Adapter when the adapter does not go to the offline state using the normal method (Channel Interface switch). This procedure would also be used when the controller is hung online and a dump is required for problem isolation.

1. Contact the system operator and have the 3174 and its attached devices varied offline from the host system.
2. Put the Channel Interface switch in the Offline position.
3. Press and hold **Alt 1**.
4. Press and release **IML**.
5. Release **ALT 1**.
6. If the offline indicator does not light, set the AC power switch to the off position.

How to Take the 3174 Model 22L Offline

The following procedure is available only when the 3174 has been IMLed with a customized Control disk. The decorative panel must be removed to access the operator panel. Replace the decorative panel when finished using the operator panel.

1. Contact the host operator to take the controller offline.
2. At the operator panel:
 - a. Press **Clear**
 - b. Key in **1700**
 - c. Press **Enter**.
3. Status code 508 appears in the status indicator meaning that the controller is offline.

How to Place the 3174 Model 22L Online

The following procedure is available only when the 3174 has been IMLed with a customized Control disk. It should be in offline mode. The decorative panel must be removed to access the operator panel. Replace the decorative panel when finished using the operator panel.

1. At the operator panel:
 - a. Press **Clear**
 - b. Key in **1701**
 - c. Press **Enter**.
2. Status code 503 appears in the status indicator meaning that the controller is ready for communication.
3. Contact the host operator to place the controller online.

General Procedures

How to Disconnect the Bus and Tag Cables

1. Ask the system operator to vary the 3174 and its attached devices offline from the host system and place the host system in the **stop** state.
2. Set the Channel Interface switch to the Offline position.
3. Wait for the offline indicator to light.
4. If the offline indicator does not light, use the procedure "How to Force the 3174 Model 21L Offline: Alt 1 Method" on page 2-291.
5. Disconnect the Tag Out channel cable or the tag terminator assembly.
6. Disconnect the Tag In channel cable.
7. Disconnect the Bus Out channel cable or the bus terminator assembly.
8. Disconnect the Bus In channel cable.
9. If the terminator assemblies were installed in this controller, install them in the preceding controller on the channel or on the ends of the bus and tag cables.
10. If four channel cables were installed, connect the Tag Out cable to the Tag In cable and the Bus Out cable to the Bus In cable.
11. Notify the host operator to press the start key at the host to put the system back in the **run** state.

How to Switch the Power On at the 3174 Model 21L

1. Set the Power switch to the on position.
2. Turn the Channel Interface switch to Online.

How to Switch the Power Off at the 3174 Model 21L

1. Take the 3174 offline from the channel. See "How to Take the 3174 Model 21L Offline" on page 2-290.
2. Set the power switch to off.

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.

Note: On some terminals, an S, 4, or 6 is a normal ready condition which means the terminal is communicating with the 3174.

1. At the terminal to be tested, switch the Normal/Test switch from Normal to Test and back again or turn the power off and back on again. Some terminals require up to two minutes to complete this sequence.
2. Check the terminal for the ready symbol (S, 4, or 6) in the operator information area. For printers, check for the appropriate ready indicator. For some terminals, such as a personal computer, you may need to change the mode of the terminal that allows communication with the 3174.
3. If the ready condition is on, the terminal and the port it is attached to are working properly. Return to the MAP that sent you here.
4. If the ready condition is not on, then the hardware configuration from the terminal back to the controller is failing. Return to the MAP that sent you here.

How to Perform the Coaxial Cable Ground Loop Check

DANGER

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, telephone twisted-pair, or fiber optic 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 connected only 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" on page 2-294. If the meter indicates an AC voltage greater than 1 volt, AC ground is not correct. **A hazardous condition exists.** The power cord is damaged or the AC power source is not 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.

General Procedures

Step 2: Coaxial Resistance Check: At the terminal end of the coaxial cable being tested, check the resistance of the coaxial cable shield.

- a. At the terminal, set the Power switch to the off position.
- b. Set the meter to the lowest resistance scale.
- c. Connect the meter between the coaxial connector and the terminal frame.
- 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."
- e. If the reading is higher than 6 ohms, the high resistance indicates that the coaxial cable shield is not grounded correctly at the controller end of the cable.

This can 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" on page 2-295.
- e. 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.
- f. Connect the coaxial cable to the terminal.
- g. 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 (megohms), 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 can 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 **a1)** through **a4)** 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.

Measuring the 3174 Enterprise Systems Connection Adapter Transmit and Receive Levels

The following tools and materials are needed for these procedures.

- Optical Power Meter - P/N 18F7005
- Fiber Optic Cleaning Kit - P/N 5453521
- Duplex-to-Duplex Coupler - P/N 18F6952 (supplied with the Fiber Optic Test Support Kit, P/N 18F6953)
- Duplex-to-Biconic Test Cable 3.0m - P/N 18F6948 (supplied with the Fiber Optic Test Support Kit, part 18F6953).

Verifying the ESCON Adapter Transmit/Receive Operation: Use these procedures to verify that the ESCON Adapter transmitter is operating properly and the receive level input is within tolerance.

All transmit and receive power levels must be recorded as directed. If it is determined that the ESCON Adapter is not the cause of the problem, you will be directed to another maintenance package, where you will need to know the recorded power levels from these procedures.

ESCON Adapter Transmitter Level Measurement

1. If there is a fiber optic cable or wrap plug connected to the ESCON Adapter, remove it.
2. Clean the duplex-to-biconic test cable connectors using the fiber optic cleaning kit.
3. Attach the duplex-to-biconic test cable duplex connector to the ESCON Adapter.
4. If the optical power meter has **not** been previously turned on, zeroed, and set to the proper scale, set the meter using the procedure in "Optical Power Meter Setup" on page 2-296.
5. After the meter is set, connect the black, biconic connector of the test cable, P/N 18F6948, to the biconic receptacle on the top of the power meter.

General Procedures

6. Run the Send Offline Sequence Test (FN 02). See "How to Run the Send Offline Sequence Test (FN 02)" on page 2-129.
7. Record the power level displayed on the power meter.
8. Remove the test cable duplex connector from the ESCON Adapter. Do not remove the test cable black-coded biconic connector from the power meter biconic receptacle.
9. Go to "ESCON Adapter Receive Level Measurement."

ESCON Adapter Receive Level Measurement

Note: The host or ESCD must be running a test that generates a continuous send offline sequence signal before you can perform this procedure.

1. Clean the customer's fiber optic cable duplex connector and the duplex-to-duplex coupler using the fiber optic cleaning kit.
2. If the optical power meter has **not** been previously turned on, zeroed, and set to the proper scale, set the meter using the procedure in "Optical Power Meter Setup."
3. After the meter is set, connect the black, biconic connector of the test cable, P/N 18F6948, to the biconic receptacle on the top of the power meter.
4. Attach the test cable duplex connector and the customer's fiber optic cable duplex connector to the duplex-to-duplex coupler.
5. Record the power level displayed on the power meter.
6. Remove all test equipment from the ESCON Adapter.
7. Reconnect the customer's fiber optic cable to the ESCON Adapter and return to the procedure that sent you here.

Optical Power Meter Setup: This procedure can be ignored if the optical power meter (Part 18F7005):

Has been turned on
Set for 1300 nanometers (nm)
Zeroed
Has the dBm scale displayed.

If not, perform the following:

Note: Do not hold down a pushbutton for more than one-half second. When held down for more than about three seconds, the pushbutton produces results different from those required.

1. Ensure that the black cap is over the biconic receptacle at the top of the power meter.
2. Press power **On/Off**. AUTO OFF will be displayed; the meter will turn off if no button is pressed within 10 minutes. Allow a two-minute warm-up period.
3. If the meter does not display 1300 nm (nanometers), repeatedly press the λ (lambda) pushbutton until 1300 nm is displayed.
4. Press **Zero**. Two displays will be seen.
 - A value between 0.30 to 0.70 nW (nanowatts).
 - **ZERO**. After a short time ZERO will blink indicating that the meter is properly zeroed.

If not, and Hi or Lo is displayed after pressing ZERO, press **ZERO** again and, using a jewelers screwdriver, adjust the trim pot that is beside the biconic receptacle at the top of the meter until a value between 0.30 to 0.70 nW is displayed. Set the value to 0.50, if possible.

Press **ZERO** again to zero the meter.

5. The meter must also display dBm (decibel, based on 1 milliwatt). If nW is displayed, press **dBm/Watt**.

Modem Specifications and Switch Settings

The following information on modem specifications and switch settings applies to modems connected to an Asynchronous Emulation Adapter (AEA) port.

The Asynchronous Emulation Adapter feature supports leased line, switched line, and limited distance modems that provide full-duplex asynchronous operation and equal transmit and receive speeds, and that conform to EIA 232D specifications. The AEA feature also supports auto-call modems that conform to the EIA 232D specifications and to the IBM Attention Command Set (AT), the Hayes** AT command set, the Micom** auto-dial procedure, or the AEA manual calling requirement.

IBM 5841 and 5842, Hayes Smartmodem** 300 and 1200, and Micom Data Modems, Models 3012 and 3024, are intelligent modems supported for auto-dial to ASCII hosts. The dial strings can be either stored in the 3174 during customizing, or entered from a display station keyboard (manual dial).

For automatic calling (autocall), the AEA's interface to IBM, Hayes, and Micom intelligent modems conforms to the specification in the documentation supplied with each modem. For manual calling, the AEA acts only as a conduit for a user-to-modem conversation; the user represents the interface to the intelligent modem and must have a detailed understanding of the modem's commands and responses.

These modems should be set up following these general specifications:

- Asynchronous, EIA 232D transmission
- 300 or 1200 bits per second (IBM 5842 can operate at 2400 bits per second)
- Auto-answer or auto-dial
- For auto-dial operation, 9- or 10-bit character length (including start, parity, and stop bits) is required.

General Procedures

IBM 5841 and 5842 Setup: IBM 5841 and 5842 modems are operated in Attention Command Set (AT) mode; any parameters set by commands that are required for operation with the AEA feature are the same as for Hayes modems. However, the switch settings for IBM 584x modems are not compatible with Hayes and must be set as specified here.

For the IBM 5842 modem, the six front panel switches must be in the "out" position. In addition, the eight configuration switches must be set as described in Table 2-26.

Table 2-26. IBM 584x Modem Switch Settings

Switch Number	Option Name	Switch Setting	Description
1	Receive Line Signal Detect (RLSD)	ON	RLSD (also called Carrier Detect) is raised at connection time.
2	Reset to Default Options on Loss of DTR	OFF	When this switch is set to OFF, the 3174 can reset the modem to a known state by dropping DTR. If register settings are not required for special installation requirements, this reset can be used to avoid unexpected results that can arise from previous use. Not used on 5841.
3	Transmit Timing Option (Synchronous mode only)	Not Used	
4	Asynchronous or Synchronous Mode	ON	Asynchronous mode is used.
5	Source of Data Terminal Ready (DTR)	ON	AEA controls DTR.
6	Transmit Clocking from Remote Modem (Synchronous Mode Only)	NA	
7	Request to Send (RTS)	OFF	AEA controls RTS.
8	Data Set Ready (DSR)	ON (5841 only) OFF (5842 only)	DSR must always be on for the 5841. DSR is raised during the connection sequence with the DTE for the 5842.

Hayes Smartmodem 1200 Setup: A Hayes Smartmodem 1200 should be set up as described in Table 2-27. Once the Hayes modem is turned on, many of the operating parameters or default values can be overridden by keyboard commands entered during Online Test 12 (/12 test). See "Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests" on page 2-237 for Test 12 procedures. In Table 2-27, a register number is the Hayes S Register number that can be set by sending commands to the modem from the keyboard.

Table 2-27. Hayes Smartmodem 1200 Configuration Switch Settings

Switch Number	Option Name	Switch Setting	Description
1	Data Terminal Ready (DTR)	UP	The station supports DTR.
2	Connection indication state format	UP	The results are sent as messages in English (also see V command).
3	Connection state indication	DOWN	Results are sent (also see Q command).
4	Command mode echo	UP	All characters sent to the modem while it is in command state are echoed back to the display.
5	Automatic answer	UP	The modem answers incoming calls (after a number of rings specified in register S0 [default=1]).
6	Carrier Detect (CD) lead handling	UP	Carrier Detect reflects carrier (DOWN during command mode).
7	Telephone jack	Not Used	UP = Single line RJ11 jack DOWN = Multiple line RJ12 or RJ13 jack. Should match your installation.
8	Command mode recognition	DOWN	The modem recognizes its commands before connection and its command mode escape during a connection.

General Procedures

Table 2-28. Hayes Smartmodem 1200 S Register Settings

Register Number	Description
0	Ring to answer on. See switch 5 in Table 2-27 on page 2-299. Not relevant to AEA operation.
2	Escape code. Not relevant to AEA operation.
3	Carriage return code. Command and result code terminator can be changed for nonstandard equipment. Set to 13 (default).
4	Line feed code. Line feed follows carriage return when English result codes are selected. Set to 10 (default).
5	Backspace code. Not relevant to AEA operation.
6	Wait for dial tone (default=2 seconds). The amount of time the modem waits for a dial tone. Not relevant to AEA operation.
7	Wait for carrier (default=30 seconds). The amount of time the modem waits for the remote station to answer before terminating the call. Not relevant to AEA operation.
8	Pause time caused by comma in dial string (default=2 seconds). Not relevant to AEA operation.
9	Carrier Detect Delay. Not relevant to AEA operation.
10	Delay time between carrier loss and outage notification (default=0.7 second). Not relevant to AEA operation.
11	Tone dialing speed (default=0.070 second). Should be set to match the central telephone switch of your PBX. Not relevant to AEA operation.
12	Escape to command mode guard time (default=1 second). Not relevant to AEA operation.
16	Self Test mode (default=0). This can be set to 1 by using online Test 12 to run modem tests. For autocal operation, register 16 must be set to 0 (default).

Micom Data Modems: S1 and S2 switch groups on Micom's 3012 and 3024 modems should be set to OFF. Other setup options can be set by using the modem's configuration menu. This menu is accessed by using online Test 12 (see "Test 12 Configuration B/C: Asynchronous Emulation Adapter Tests" on page 2-237 for the procedure). The default settings are suitable to AEA operation.

How to Use the 3174 Patch Procedure

The patch procedure provides the ability either to add two types of patches or to process an existing patch. The two types of patches that can be added are PC and Zap patches. When a patch is added, a check digit and a line count are entered as part of the patch data to verify all patch data has been keyed in correctly. The patches can be installed either on the diskettes or the fixed disks. Sixty patches can be installed on the Control disk, 60 on the Utility disk, and 60 on the DSL disk.

PC Patches: PC patches are applied only to the link-edited microcode that is contained on the Control disk. PC patches are prefixed with the letters "PC." PC patches are not connected in any way with the IBM Personal Computer. When these patches are added, they are displayed on the patches panel of the Control disk. When a PC patch is added, data is entered only on those panels that are required for the patch being added. When a panel is displayed that does not require any input, use PF8 to bypass that panel or PF12 to process the patch if all the required patch data has been entered.

Zap Patches: Zap patches are applied to prelinked microcode that is contained on the Control, Utility (also the Limited Function Utility), or DSL disk. Zap patches are prefixed with the letters ZC, ZU, or ZM. ZC means the patch is applied to the microcode on the Control disk. ZU means the patch is applied to the microcode on the Utility disk. ZM means the patch is applied to the microcode on the DSL disk.

Processing a Patch: This procedure provides the capability of including a patch during an IML, omitting a patch from an IML, or deleting a patch from the control, Utility, or DSL disk.

Starting the Patch Procedure:

If you are using a Utility diskette, go to Step 1.

If the Utility microcode is on a fixed disk, go to Step 7a.

1. Insert the Utility diskette in diskette drive 1.
 - a. Press and hold **Alt 1**
 - b. Press and release **IML**.
 - c. Release Alt 1.
2. At 40, key in **0140** to select diskette drive 1 and display the Master Menu on port 0.
3. Press **Enter**.
4. Go to the terminal connected to port 0 on HG 26.
The Master Menu is displayed.
5. Type in **P**. (This option is not shown on the menu.)
6. Press **ENTER**, and go to Step 13 on page 2-302.
7. **If the Utility microcode is on a fixed disk:**
 - a. Press and hold **Alt 1**
 - b. Press and release **IML**.
 - c. Release Alt 1.
8. At 40, key in 0340
03 = fixed disk drive 1
40 = Display the Master Menu
9. Press **Enter**.

General Procedures

10. Go to the terminal connected to port 0 on HG 26.

The Master Menu is displayed.

11. Type in **P** (This option is not shown on the menu.)

12. Press **ENTER**.

_____ Patch Menu _____	
Option	Description
1	Patch Control Dsk
2	Patch Utility Dsk
3	Patch DSL Dsk
4	Patch Limited Function Utility Disk

Select **===>** _

Select option, press **ENTER**

Figure 2-122. Patch Menu

13. Select the Option number of the disk you are patching.

14. Press **ENTER**. The following panel is displayed on your terminal and the line containing the selected disk is highlighted.

```

_____ Patch Menu _____

Option   Description
  1      Patch Control Dsk
  2      Patch Utility Dsk
  3      Patch DSL Dsk
  4      Patch Limited Function Utility Disk
    
```

Available drives: 1 2 3 4 To ==> 1

Verify drive selection, press ENTER

Figure 2-123. Disk Drive Selection Menu

15. Type in 1, 2, or 3 for your To (or target) drive. For example, if you have two diskette drives installed (Available drives would be 1 and 2) and you wish to use drive 2 for the disk being patched, change the target number to 2. Of course if you have only one diskette drive installed, you must leave the target number set to 1.
16. Press **ENTER**. The following panel is displayed on your terminal.

```

_____ Patch Menu _____

Option   Description
  1      Patch Control Dsk
  2      Patch Utility Dsk
  3      Patch DSL Dsk
  4      Patch Limited Function Utility Disk
    
```

Available drives: 1 To ==> 1

Insert XXX disk, press ENTER

XXX = the disk you selected to patch. This message does not appear if you are patching a fixed disk.

Figure 2-124. Disk Drive Selection Menu

General Procedures

17. If you are patching a fixed disk, go to step 18. Otherwise, insert the selected diskette into the target drive.
18. Press **ENTER**. The Patches panel is displayed (see Figure 2-125).
 - To add a patch, go to "Adding a Patch."
 - To add a Zap patch, go to "Adding a Zap Patch" on page 2-307.
 - To process a patch, go to "Processing an Existing Patch" on page 2-309.

Adding a Patch: The Patches panel shown in Figure 2-125 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.

```

                _____ Patches _____
                1=Include in IML  2=Omit from IML  3=Delete

XXX DSK:

- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....
- ..... - ..... - ..... - ..... - .....

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

XXX = the disk you selected to patch.

Figure 2-125. Patches Panel

1. Press PF10.

The following panels are displayed:

- a. Patch Header panel (see Figure 2-126 on page 2-305)
- b. Patch Data panel (see Figure 2-127 on page 2-305)
- c. Relocatable Information panel (see Figure 2-128 on page 2-306)
- d. Call to Patch Area panel (see Figure 2-129 on page 2-306).

2. Fill in the fields as required for the patch being added.
3. Press PF12 or PA2 on keyboards that do not have a PF12 key.

The patch processes and the Patches panel appears with the new patch number displayed.

Enter data only on the panels required by the patch being installed. If the patch data does not indicate a particular panel must be filled in, press PF8 to bypass that panel.

```

_____ Patch Header _____

Patch ID ..... _____
Microcode Level ..... _____
Line Count ..... _____
Clan ..... _____
Selection Criteria ..... _____ 8000
Check Digit..... _____

PF :3=Quit          8=Fwd
    
```

Figure 2-126. 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 2-127. Patch Data Panel

General Procedures

_____ Relocatable Information _____

CSECT to be Modified..... _____
CSECT to be Resolved..... _____
Offset within CSECT to be Modified..... _____
Offset within CSECT to be Resolved..... _____
RLD Type..... _____
Check Digit..... _____

PF: 3=Quit

8=Fwd

11=More

Figure 2-128. Relocatable Information Panel

_____ Call to Patch Area _____

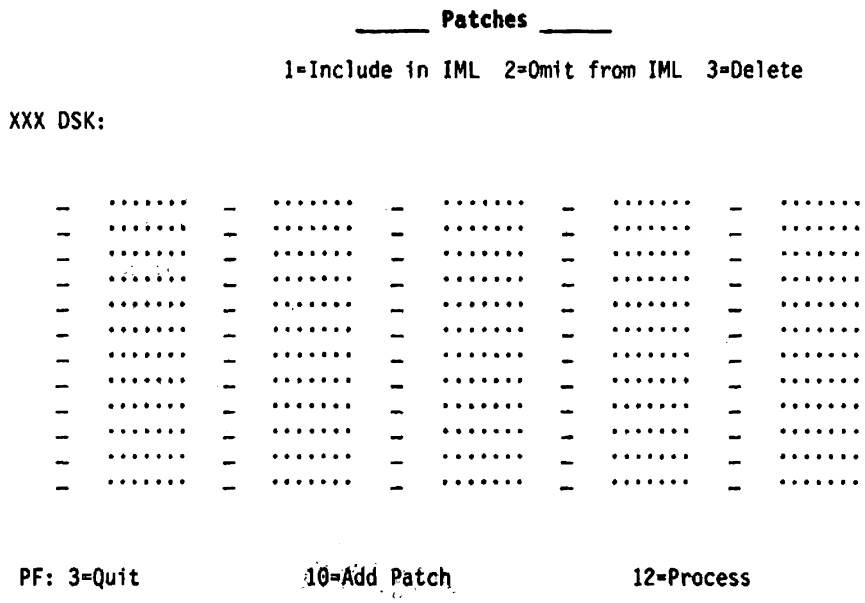
CSECT Calling to Patch Area _____
Offset of Call in Calling CSECT _____
Return Register _____
Check Digit _____

PF: 3=Quit

12=Process

Figure 2-129. Call to Patch Area Panel

Adding a Zap Patch: Figure 2-130 shows the Patches panel before a Zap patch is added.



XXX = the disk you selected to patch.

Figure 2-130. Patches Panel (Adding a Zap Patch)

1. Press PF10.
 - The following panels display:
 - a. Patch Header panel (see Figure 2-131 on page 2-308)
 - b. Zap Patch panel (see Figure 2-132 on page 2-308).
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.

General Procedures

_____ Patch Header _____

Patch ID _____
 Microcode Level _____
 Line Count _____
 Clan _____
 Selection Criteria _____ 8000
 Check Digit..... _____

PF :3=Quit

8=Fwd

Figure 2-131. Patch Header Panel (Adding a Zap Patch)

_____ Zap Patch _____

DOS File Name	Extension ...
Text Offset	Text Code/Data
Check Digit	Check Digit
_____ VER _____	_____
_____ REP _____	_____
_____ VER _____	_____
_____ REP _____	_____
_____ VER _____	_____
_____ REP _____	_____
_____ VER _____	_____
_____ REP _____	_____

PF: 3=Quit

12=Apply ZAP

Figure 2-132. Zap Patch Panel

General Procedures

How to Perform the 3174 Dump Procedure

The 3174 dump procedure can be performed several ways depending on 3174 status. Ultimately the dump data will be placed on a dump diskette. You can order dump diskettes from the IBM Parts Distribution Center, or create them locally if you have 3174 microcode configuration support B2 or higher. Refer to "How to Perform Media Management" in *3174 Utilities Guide* for instructions to create a dump diskette. 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 Disk Link-Edit Map
- Control Disk Configuration Files
- Control Disk Event Log and Trace
- CCA Storage
- ISDN Adapter Storage.

A dump can be performed in the following ways.

- Automatically to fixed disk 3 on a machine check error (status code 381) if the 3174 is configured for *automatic dump to fixed disk*.
- Manually from the operator panel to fixed disk 3 by entering **0344**.
- Manually to fixed disk 3 using online Test 14, Option 1,n,m (n=3 - fixed disk 3; m=44 - dump the controller).
- Automatically when a dump diskette is inserted into a diskette drive when a machine check error (status code 381) occurs.
- Manually from the operator panel to a dump diskette by entering **0140** (to diskette 1) or **0240** (to diskette 2).

Data dumped to fixed disk 3 is copied to dump diskettes using online Test 14, Option 3. If you are using a 2.4-MB Control diskette, perform the dump procedure with a 2.4-MB diskette drive. If you IMLed from the fixed disk, perform the dump procedure with a 1.2-MB or 2.4-MB diskette drive. Depending on the amount of 3174 storage installed, the dump may require multiple diskettes.

1. If the 3174 is channel attached, have the host operator take the 3174 offline. Then put the 3174 Channel Interface switch in the **Offline** position.
2. Remove the diskette from diskette drive 1, or from diskette drive 2 if it is the only 2.4-MB drive available.
3. Insert the 3174 dump diskette.
If the controller has encountered a status code 381 error, inserting a dump diskette in the diskette drive automatically starts the dump data to diskette procedure. If after a few seconds you do not see dump in progress status codes 5901 - 5905 continue with the next step.

Warning: If the following steps are not performed correctly, the failing condition information may be DESTROYED. If this happens, you must then restart the application and re-create the failing condition before a dump can be taken.

4. Press and hold **Alt 1**.
5. Press and release **IML**.
6. Release **Alt 1**.
7. If you are IMLing from diskette drive 1, when 40 appears, press **Enter**.
8. If you are IMLing from diskette drive 2, when 40 appears, key in **0240** and press **Enter**.

9. If any codes appear other than the codes shown in "Status Codes for Manual Dump" on page 2-311, see 3174 Status Codes.

Status Codes for Manual Dump

Code	Description	Action
5901 through 5905	Dump in progress	None
5907	Prompt for the Control diskette	Remove the dump diskette and insert the Control diskette. If the 3174 was IMLed from a fixed disk, 5907 does not appear. The files that would normally be copied from the Control diskette are copied from the fixed disk. Do NOT press any operator panel keys at this time.
5908 and 5909	Dump in progress	None
5910	Prompt for the dump diskette	Remove the Control diskette and insert the original dump diskette. If the 3174 was IMLed from a fixed disk, 5910 does not appear.
5912 and 5913	Dump in progress	None
5914	Prompt for another dump diskette	Remove the current dump diskette and insert another dump diskette.
5916	The dump is completed without error	Remove the diskette. Save all dump diskettes for analysis.
5919	Dump completed with error. Additional data contains information about the error.	Perform the following procedure: <ol style="list-style-type: none"> 1. Remove the dump diskettes. 2. Save all dump diskettes for analysis. 3. Press Advance and record the data. Continue until 5919 appears again. 4. Perform an Alt 2 IML to verify proper operation of the controller. See the "Alt 2 IML Procedures (Test 82)" on page 1-43. 5. See "How to Analyze Dump Completion Codes" on page 2-312 for an explanation of the information you collected in step 3 of this process.
5921	Dump completed. The contents of the dump may not be valid.	Perform the following procedure: <ol style="list-style-type: none"> 1. Remove the dump diskettes. 2. Save all dump diskettes for analysis. 3. Press Advance and record the data. Continue until 5921 appears again. 4. Perform an Alt 2 IML to verify proper operation of the controller. See the "Alt 2 IML Procedures (Test 82)" on page 1-43. 5. See "How to Analyze Dump Completion Codes" on page 2-312 for an explanation of the information you collected in step 3 of this process. 6. Re-create the failure. 7. Perform the dump procedure again. 8. Save this dump diskette for analysis.

General Procedures

How to Analyze Dump Completion Codes

Status code 5916 indicates that the dump has complete successfully and requires no further action other than saving the dump diskettes for analysis.

The rest of this procedure provides an analysis of status codes 5919 and 5921. These status codes indicate that some abnormality, hardware or software, has occurred in the 3174 during the dump operation. The cause of that abnormality can be determined by analyzing the additional data provided with the status code.

The following example describes the additional fields of status code 5919 and 5921. The information displayed may vary according to the type of failure.

5919 WXYZ BNB BNB 99MU 00

WXYZ indicates the dump copy status of files that must be copied from the Control diskette that was being used at the time of the failure. Depending on the problem that has occurred with the controller, not all files are required to analyze a dump. Use your support structure to determine if the dump was valid.

Where W is equal to:

- 0 = One group of all files copied
- 1 = Link map not copied
- 2 = Event Log / Trace file not copied (RAS)
- 3 = Log and Link map not copied
- 4 = FRUID file not copied
- 5 = Link map and FRUID files not copied
- 6 = Log and FRUID files not copied
- 7 = Link Map and Log and FRUID files not copied.

Where X is equal to:

- 0 = One group of three files copied
- 1 = CCA/ISDN Trace file not copied
- 2 = CCA 51 Link map not copied
- 3 = CCA Trace and CCA 51 Link map not copied
- 4 = CCA 52 Link map not copied
- 5 = CCA Trace and CCA 52 Link map not copied
- 6 = CCA 51 and CCA 52 Link map not copied
- 7 = CCA Trace and CCA 51 and 52 Link maps not copied.

Where Y is equal to:

- 0 = One group of two files copied
- 1 = ISDN Link map not copied
- 2 = ISDN Trace Setup file not copied
- 3 = ISDN Link map and Trace Setup file not copied
- 4 = Not used
- 5 = Not used
- 6 = Not used
- 7 = Not used.

Where Z is equal to:

- 0 = Configuration or other files copied
- 1 = Not used
- 2 = Not used
- 3 = Not used
- 4 = Configuration or other files not copied
- 5 = Not used
- 6 = Not used
- 7 = Not used.

BN = The block number of main storage or MMIO adapter on card storage, in 256KB blocks, that contained an ECC or parity error. Normally, storage errors should not be indicated during a dump procedure. The FRUs in the location indicated with errors are suspect and should be exchanged. If there are no storage failures, 00 appears instead of a BN. See Table 2-29 on page 2-316 for more information about block numbers.

99MU is included before the final 00, only if there are CCA or ISDN Adapter errors. A CCA or ISDN Adapter dump is taken only for a CCA or ISDN Adapter that was initialized on the previous Control microcode IML. The FRUs in the location indicated with errors are suspect and should be exchanged.

Where:

- 99 = An error was reported during dumping of one or more CCAs or ISDN Adapters
- M = An indicator for each CCA or ISDN Adapter with an error
- M = 0 = No error with CCA 51, CCA 52, and ISDN Adapter 39
- M = 1 = HG 51 error
- M = 2 = HG 52 error
- M = 3 = HG 51 and HG 52 error
- M = 4 = HG 39 error
- M = 5 = HG 39 and HG 51 error
- M = 6 = HG 39 and HG 52 error
- M = 7 = HG 39, HG 51, and HG 52 error
- U = An indicator for each ISDN Adapter with an error
- U = 0 = No error with HG 36, HG 37, and HG 38
- U = 1 = HG 36 error
- U = 2 = HG 37 error
- U = 3 = HG 36 and HG 37 error
- U = 4 = HG 38 error
- U = 5 = HG 36 and HG 38 error
- U = 6 = HG 37 and HG 38 error
- U = 7 = HG 36, HG 37, and HG 38 error.

General Procedures

Dump Status Codes Using Test 14

The following codes display when you invoke Test 14, Option 3 to copy dump data from fixed disk 3 to the dump diskettes.

290 00

Description: Fixed disk (disk 3) contains valid dump data. The automatic fixed disk dump function is disabled.

Possible Cause: An automatic or manual fixed disk controller dump has been taken and fixed disk 3 contains dump data.

Action: Use RAS Test 14 or OPS Panel interface to copy dump data from the hard drive to diskette media or erase dump data. After you have copied or erased the dump data on the hard drive, the automatic dump to hard drive function will be enabled if configured.

5937

Description: Controller dump prompt message.

Possible Cause: N/A—normal operation.

Action: Remove the dump diskette and insert the secondary Control diskette. The dump automatically resumes.

5940

Description: Copy dump data prompt message.

Possible Cause: N/A—normal operation.

Action: Current dump diskette is full. Remove the current dump diskette and insert the next dump diskette. The copy dump data process automatically resumes.

5941

Description: Copy dump data prompt message.

Possible Cause: An error is encountered on the current dump diskette.

Action: Remove the current dump diskette and mark it as BAD. Insert another 3174 dump diskette. Copy dump process will continue, repeating the previous data for the diskette in error.

5944

Description: Copy dump data process is in progress. 5944 alternates with 5945.

Possible Cause: N/A—normal operation.

Action: None.

5945

Description: Copy dump data process is in progress. 5945 alternates with 5944.

Possible Cause: N/A—normal operation.

Action: None.

5946

Description: Copy dump data process has been completed successfully.

Possible Cause: N/A—normal operation.

| **Action:** Remove the last dump diskette from the disk drive.

| **5949**

| **Description:** Copy dump data process failed to finish successfully.

| **Possible Cause:** Dump diskette is defective.

| **Action:** Repeat the copy dump data process using a different set of dump diskettes. Contact your next level of support. Refer to the Event Log and write down the type of 4714 error code recorded.

| **Event Log Dump Status Codes:** The following status codes are recorded in the Event Log.

| **4714 01**

| **Description:** Copy dump data process has been started.

| **Possible Cause:** Copy dump data process has been started.

| **Action:** Change dump diskettes when required by the process.

| **4714 16**

| **Description:** Copy dump data process has ended without errors.

| **Possible Cause:** N/A—normal operation.

| **Action:** Remove the last dump diskette from the disk drive.

| **4714 51 to 69**

| **Description:** Copy dump data process ended with errors.

| **Possible Cause:** AN error was encountered during the copy dump data process.

| **Action:** Repeat the copy dump data process using a different set of dump diskettes. Contact your next level of support.

General Procedures

Table 2-29. BN Numbers with Corresponding Locations

BN	Failure Type	Storage Increment	Locations		
			2MB+2MB	2MB+4MB	6MB
01	Main storage	0 to 0.25MB	J22	J22	J22
02	Main storage	0.25MB to 0.5MB	J22	J22	J22
03	Main storage	0.5MB to 0.75MB	J22	J22	J22
04	Main storage	0.75MB to 1.0MB	J22	J22	J22
05	Main storage	1.0MB to 1.25MB	J22	J22	J22
06	Main storage	1.25 to 1.5MB	J22	J22	J22
07	Main storage	1.5MB to 1.75MB	J22	J22	J22
08	Main storage	1.75MB to 2.0MB	J22	J22	J22
09	Main storage	2.0MB to 2.25MB	J23	J23	J22
10	Main storage	2.25MB to 2.5MB	J23	J23	J22
11	Main storage	2.5MB to 2.75MB	J23	J23	J22
12	Main storage	2.75 to 3.0MB	J23	J23	J22
13	Main storage	3.0MB to 3.25MB	J23	J23	J22
14	Main storage	3.25MB to 3.5MB	J23	J23	J22
15	Main storage	3.5MB to 3.75MB	J23	J23	J22
16	Main storage	3.75MB to 4.0MB	J23	J23	J22
17	Main storage	4.0MB to 4.25MB	N/A	J23	J22
18	Main storage	4.25MB to 4.5MB	N/A	J23	J22
19	Main storage	4.5MB to 4.75MB	N/A	J23	J22
20	Main storage	4.75MB to 5.0MB	N/A	J23	J22
21	Main storage	5.0MB to 5.25MB	N/A	J23	J22
22	Main storage	5.25MB to 5.5MB	N/A	J23	J22
23	Main storage	5.5MB to 5.75MB	N/A	J23	J22
24	Main storage	5.75MB to 6.0MB	N/A	J23	J22
25	MMIO Adapter		11	11	11
26	MMIO Adapter		11	11	11
27	MMIO Adapter		12	12	12
28	MMIO Adapter		12	12	12
29	MMIO Adapter		13	13	13
30	MMIO Adapter		14	14	14
31	MMIO Adapter		15	15	15
32	MMIO Adapter		N/A	N/A	N/A

3174 Display Subsystem S/370 OLTs

This section describes the S/370 online tests (OLTs) for Models 21L and 21R (SNA and non-SNA).

Warning: While running OLTs, DO NOT PRESS any keys on any terminals attached to the controller being tested. False errors or unexpected failures can occur.

Model 21L (SNA) 3174B OLTs

This OLT provides testing for the 3174 Models using (SNA) local channel attachment and supplements the testing that is performed during the IML sequences of the 3174. For additional information, see *OLTs User's Guide*, D99-3174D.

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

Applicable Executive Control Program: These OLTs are compatible with the following control programs at the levels indicated or higher:

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

Composite Error Message Description: Following is an example of a maximum configuration of error message content for Model 21 (SNA), with an explanation of each item.

Item Content

1. T3174B - v1 RTN nn DEV/LN ccuu ECAec REFNUM yyzzz
2. PLINK ID = X3174ss-v1
3. Test and failure description (can be a total of 8 lines)
4. CCW01 command address flags count CAW address
5. CCWnn command address flags count
6. XPTD CSW1 XX last ccwaddr+ 8 status count
7. RCVD CSW1 X0 last ccwaddr+ 8 status count
8. XPTD CSW2 XX last ccwaddr+ 8 status count
9. RCVD CSW2 X0 last ccwaddr+ 8 status count
10. XPTD CC condition code RCVD CC condition code
11. XPTD SNS sense data
12. RCVD SNS sense data
13. XPTD DATA expected data
14. RCVD DATA received data
15. WRTN DATA write data
16. Test message (can be up to 9 lines)

Item Explanation

- | | |
|---|---|
| 1 | This is the standard header line provided by OLTs EP: |
| | T3174B ID of 3174 OLT root module |
| | v1 Version and level of root module |
| | nn Decimal value of routine number |
| | ccuu Address of 3174 |
| | ec FE announcement letter number describing a required change |

General Procedures

yyzzz Hexadecimal equivalent of routine number and error
ID within that routine

2 X3174ss ID of active test module during error
v1 Version and level of test module

Note:

A PLINK ID of XXXXXXXXXX means no plink module was active when the error occurred.

- 3 These lines provide the name of the test and the failure description. These lines are printed in all error messages.
- 4 - 5 These lines define the CCWs and CAW issued at the time of the error. These lines are printed in all error messages.
- 6 - 7 These lines contain the hexadecimal data for the expected and received CSWs. These lines are printed in all error messages except for timeout of the I/O event.
- 8 - 9 These lines contain the hexadecimal data for the expected and received CSWs for the second interrupt (if there is one). These lines are printed only when the expected and received CSWs are not equal to zero.
- 10 The expected and received condition codes. This line is printed only when the expected and received CCs are not equal.
- 11 - 12 These lines contain the hexadecimal data for the expected when the expected and received SNSs are not equal. The sense bits are defined below.

Byte 0

Byte 1

Bit 0	Command reject	Bit 0	Data length check
1	Intervention required	1	Data reject
2	Bus out check	2	This bit is not assigned
3	Equipment check	3	This bit is not assigned
4	Data check	4	Parity check modifier
5	Overrun (bit not used)	5	Parity check number 1
6	Not initialized	6	Parity check number 2
7	This bit is not assigned	7	Cycle steal machine check

13 - 14 Lines 13 and 14 contain the hexadecimal data for the expected and received data (if any). These lines are printed in all error messages where the failing routine executed a read type command.

15 The hexadecimal write data (if any). These lines are printed in all error messages where the failing routine executed a write type command.

16 - 24 These lines can be used to provide additional messages for the error printout.

OLT Routines: Table 2-30 lists the T3174B online test routines. Included are the Kingston control number, the module identification, the routine numbers, and the titles.

Table 2-30. T3174B OLT Routines

Kingston No.	Module ID	Routine No. Dec HEX	Title
K745	X3174AA	1 01	Test No Op Control Command
K746	X3174AB	2 02	Test Sense ID Command
K747	X3174AC	3 03	Test Vary Activate Sequence
K748	X3174AD	4 04	Test Vary Deactivate Sequence

CDS Card Format, Model 21L (SNA): Table 2-31 shows the CDS card format for the local 3174 Model 21L (SNA) display subsystem online tests.

Table 2-31. Model 21L CDS Card Format (SNA)

Card Column	Equivalent CDS Byte	Content
1	—	Leave blank
2 - 4	—	CDS
5 - 9	—	Leave blank
10 - 17	0 - 3	Channel, controller device address
18 - 21	4 - 5	Leave blank
22 - 23	6	40 = Class code
24 - 25	7	F3 = type code
26 - 35	8 - 11	Leave blank
36	—	Slash (/) - End of CDS

Model 21L (Non-SNA) 3174A OLTs

This OLT provides testing for the 3174 Model 21L (non-SNA) display subsystem local channel attachment and supplements the testing that is performed during the IML sequences of the 3174. For additional information, see *OLTs User's Guide*, D99-3174D.

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

Applicable Executive Control Program: These OLTs are compatible with the following control programs at the levels indicated or higher:

OLTSEP 9.0
 DOS OLTEP 26
 TCAM TOTE 10
 OS OLTEP 21.8
 VTAM TOLTEP 2.0
 OS/VS1 OLTEP 6
 DOS/VS OLTEP 33
 OS/VS2 SVS OLTEP 1.7
 OS/VS2 MVS OLTEP 3.7

General Procedures

Composite Error Message Description: Following is an example of a maximum configuration of error message content for Model 21L (non-SNA), with an explanation of each item.

Item Content

1. T3174A – v1 RTN nn DEV/LN ccuu ECAec REFNUM yyzzz
2. PLINK ID = X3174ss–v1
3. Test and failure description (can be a total of 8 lines)
4. CCW01 command address flags count CAW address
5. CCWnn command address flags count
6. XPTD CSW1 XX last ccwaddr+ 8 status count
7. RCVD CSW1 X0 last ccwaddr+ 8 status count
8. XPTD CSW2 XX last ccwaddr+ 8 status count
9. RCVD CSW2 X0 last ccwaddr+ 8 status count
10. XPTD CC condition code RCVD CC condition code
11. XPTD SNS sense data
12. RCVD SNS sense data
13. XPTD DATA expected data
14. RCVD DATA received data
15. WRTN DATA write data
16. Test message (can be up to 9 lines)

Item Explanation

- | | |
|-------|--|
| 1 | This is the standard header line provided by OLTs EP:
T3174A ID of 3174 Model 21L (non-SNA) OLT root module
v1 Version and level of root module
nn Decimal value of routine number
ccuu Address of 3174 Model 21
ec FE announcement letter number describing a required
change
yyzzz Hexadecimal equivalent of routine number and error
ID within that routine |
| 2 | U3174ss ID of active test module during error
v1 Version and level of test module

Note:
A PLINK ID of XXXXXXXXXX means no plink module was active
when the error occurred. |
| 3 | These lines provide the name of the test and the failure
description. These lines are printed in all error messages. |
| 4 - 5 | These lines define the CCWs and CAW issued at the time of the error.
These lines are printed in all error messages. |
| 6 - 7 | These lines contain the hexadecimal data for the expected and
received CSWs.
These lines are printed in all error messages except for
timeout of the I/O event. |
| 8 - 9 | These lines contain the hexadecimal data for the expected and
received CSWs for the second interrupt (if there is one). These
lines are printed only when the expected and received CSWs are
not equal to zero. |
| 10 | The expected and received condition codes. This line is
printed only when the expected and received CCs are not equal. |

- 11 - 12 These lines contain the hexadecimal data for the expected and received sense data (if any). These lines are printed only when the expected and received SNSs are not equal.
- 13 - 14 Lines 13 and 14 contain the hexadecimal data for the expected and received data (if any). These lines are printed in all error messages where the failing routine executed a read type command.
- 15 The hexadecimal write data (if any). These lines are printed in all error messages where the failing routine executed a write type command.
- 16 - 24 These lines can be used to provide additional messages for the error printout.

OLT Routines: Table 2-32 lists the T3174A online test routines. Included are the Kingston control number, the module identification, the routine numbers, and the titles.

Table 2-32. T3174A OLT Routines

Kingston No.	Module ID	Routine No. Dec HEX	Title
K721	U3174AA	1 01	Test No Op Control Command
K722	U3174AB	2 02	Test Valid Commands for Acceptance
K723	U3174AC	3 03	Test Invalid Commands and Sense Command Operation
K725	U3174AE	5 05	Test Sense ID Commands
K728	U3174AH	3 03	Test Chained Commands
K731	U3174AK	11 0B	Test Unchained Commands

CDS Card Format, Model 21L (Non-SNA): Table 2-33 shows the CDS card format for the local 3174 Model 21L (non-SNA) display subsystem online tests.

Table 2-33. Model 21L CDS Card Format (non-SNA)

Card Column	Equivalent CDS Byte	Content
1	—	Leave blank
2 - 4	—	CDS
5 - 9	—	Leave blank
10 - 17	0 - 3	Channel, controller device address
18 - 19	4	Leave blank
20 - 21	5	Must be X'00'
22 - 23	6	10 = Class code
24 - 25	7	11 = type code
26 - 35	8 - 11	Leave blank
36	—	Slash (/) - End of CDS

Model 21R OLTs

These OLTs provide path testing for the 3174 Model 21R host attachment downline from a 270x or 370x. (See Table 2-34 on page 2-322).

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

Table 2-34. 3174 Model 21R OLTs

Configuration	OLTs User's Guide	OLT
3174 Model 21R, BSC operating with a 270x or a 370x with the Emulator Program (EP)	D99-3174B	R3174A
3174 Model 21R, BSC operating with a 270X, 370X EP, or a 370X NCP; R3174B requires that the 3700 Series Diagnostics be cataloged at the host. It is suggested that R3174A be used when operating with a 270X or 370X EP.	D99-3174-C D99-3700A	R3174B
3174 Model 21R, SDLC operating with a 370X NCP. Use the following link level tests:		
Link Level 1	D99-3700C	T3700LTE
Link Level 2	D99-3705A	T3705

Applicable Executive Control Program: These OLTs are compatible with the following control programs at the levels indicated or higher:

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

Chapter 3. Repair Information

Component Locations	3-2
Type and Hardware Group Numbers	3-4
Interrupt Levels	3-5
ISDN Adapter Cabling	3-6
Removal/Replacement Procedures	3-7
Feature Card Removal/Replacement	3-7
Card Plugging Information	3-7
Storage Card Installation Restrictions	3-7
Storage Card Removal/Replacement	3-10
Power Supply Removal/Replacement	3-11
Planar Board Removal/Replacement	3-12
Operator Panel Removal/Replacement	3-14
Fan Removal/Replacement	3-14
Diskette Drive Removal/Replacement	3-16
Fixed Disk Drive Removal/Replacement	3-17
Bus/Tag Tailgate Assembly Removal/Replacement	3-18
Logic Board Removal/Replacement	3-19
Installing the logic board	3-21

Repair Information

This chapter contains 3174 locations, an interrupt level chart, and removal/replacement procedures.

Component Locations

Figure 3-1 shows the physical locations of the components in the Model 21L.

Figure 3-2 on page 3-3 shows the physical locations of the components in the Models 21R and 23R.

Figure 3-3 on page 3-3 shows the physical locations of the components in the Model 22L.

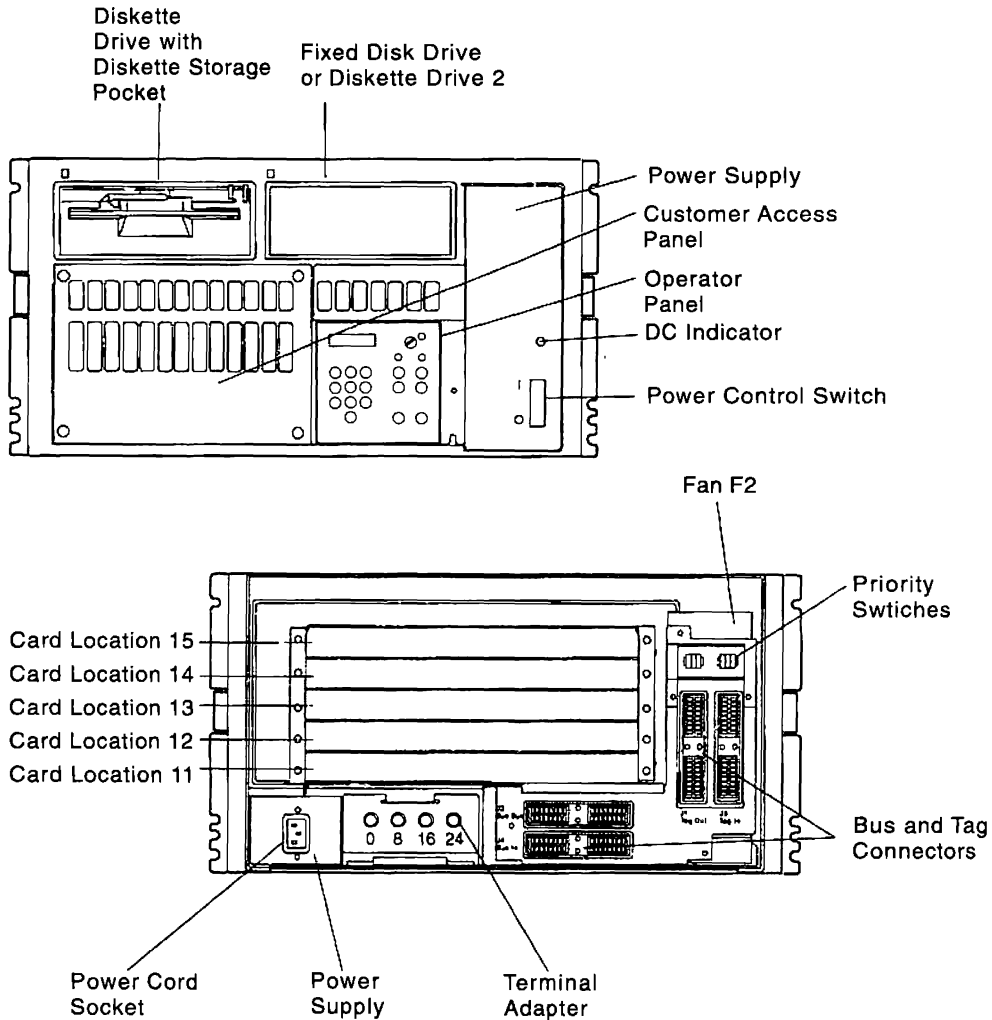


Figure 3-1. 3174 Component Locations on the Model 21L

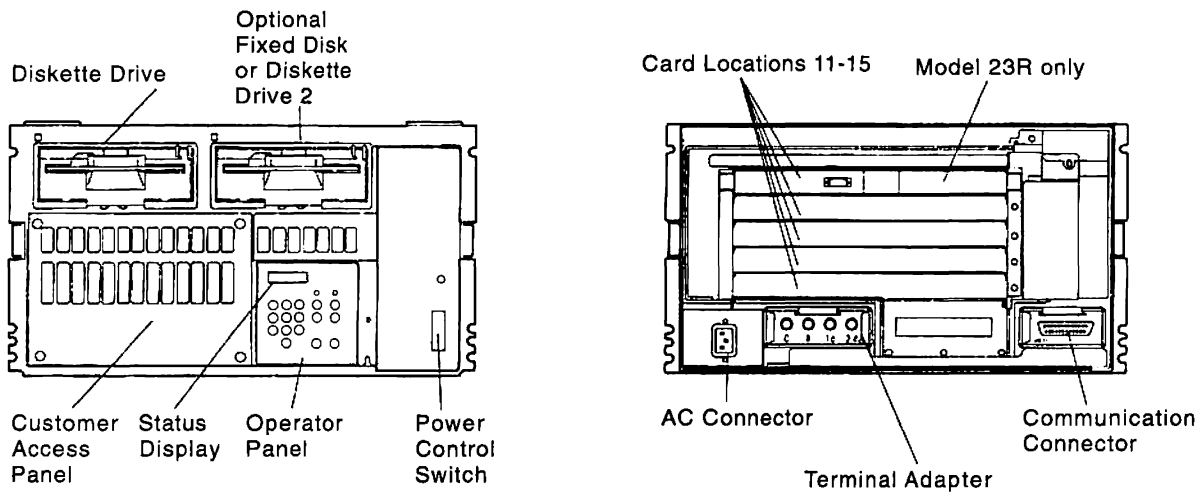
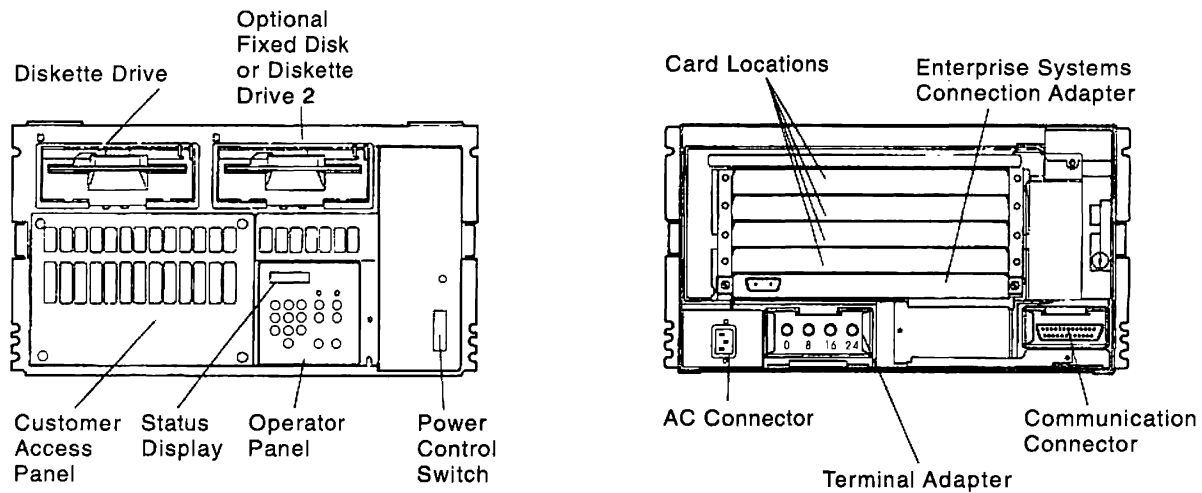


Figure 3-2. 3174 Component Locations on the Models 21R and 23R

Note: The Model 23R looks just like the Model 21R. The only difference is that the Model 23R comes with a token-ring adapter already installed. The card location in which the token-ring adapter is installed is determined by the total number of features installed.



Front, Model 22L

Rear, Model 22L

Figure 3-3. 3174 Component Locations on the Model 22L

Repair Information

Type and Hardware Group Numbers

Table 3-1 shows the Type Numbers and Hardware Group numbers associated with the Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R.

Table 3-1. Type Numbers

Type	HG	FRU
0000		Invalid or Unknown
9000		Empty Card Location
9001		Invalid Card/Cond
9176	26/27	Terminal Multiplexer Adapter
9263	51/52	Type 1 Concurrent Communication Adapter (EIA/V.35)
9267	51/52	Type 2 Concurrent Communication Adapter (X.21)
9311	21/22/23	Asynchronous Emulation Adapter
9341	36/37/38/39	Integrated Services Digital Network Adapter
9344	41	Ethernet Adapter
9351	31	Token-Ring Adapter (16/4Mbps)
9361	01/02	Diskette Drive 2.4MB
9365	03	Fixed Disk Drive
9482	87	2MB Storage Card
9486	87	1MB Storage Card
9493	87	4MB Storage Card
9497	87	6MB Storage Card
9550	09	Operator Panel (Model 21L)
9551	16	Internal channel cable tailgate
9552	16	Channel tailgate (Model 21L)
9560	09	Operator Panel (Models 21R, 22L, and 23R)
9630		Planar board (Model 21L)
9661		Planar board Models 21R, 22L, 23R (EIA/V.35)
9710		Planar board with 3270 Port Expansion Feature (Model 21L)
9731		Planar board with 3270 Port Expansion Feature (Models 21R, 22L, and 23R)
9750	26/27	Fiber Optic Terminal Adapter
9810	17	Enterprise Systems Connection Adapter

Interrupt Levels

Table 3-2 shows the card FRU type number, the physical location number, and the interrupt level that a particular card uses.

Table 3-2. Interrupt Level Chart

Card	Interrupt Level	Type	Location
Processor	0	9630 9661 9710 9731	03
Channel Adapter	1	9630 9710	03
Enterprise Systems Connection Adapter	1	9810	11
ISDN Adapter	1	9341	11–15
Token-Ring Adapter	1	9351	11–15
Ethernet Adapter	1	9344	11–15
Communication Adapter	1	9661 9731	03
Concurrent Communication Adapter	1	926X	11–15
File Adapter	2	9630 9661 9710 9731	03
Terminal Adapter	3	9630 9661 9710 9731	03
Asynchronous Emulation Adapter	3	9311	11–13

ISDN Adapter Cabling

As illustrated in Figure 3-4, German customers require a special adapter to fit the ISDN cable into the Network Terminator used by German telephone companies. IBM does not provide this adapter. It is available through the Telegaertner company in Germany.

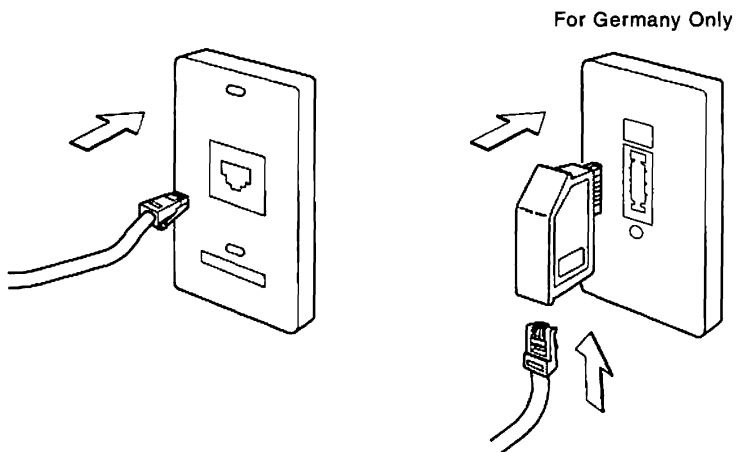


Figure 3-4. ISDN Adapter Cables

Removal/Replacement Procedures

This section provides the information needed to remove and replace field replaceable units (FRUs): feature cards, power supply, diskette drives, fixed disks, bus/tag tailgate assembly, fans, and planar board.

Feature Card Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See “How to Take the 3174 Model 21L Offline” on page 2-290 or “How to Take the 3174 Model 22L Offline” on page 2-291. Place the 3174 offline before you switch power off.

Be sure to label and disconnect any cables attached to the card you are removing.

Card Plugging Information: The following information describes card plugging locations and restrictions:

- The 9176 and 9750 cards (Terminal Multiplexer Adapter and Fiber Optic Terminal Adapter cards, respectively) are installed in the first available location starting at location 15.

Note: FTA cards cannot be installed in location 15 in Europe.

- The 9351 card (16/4Mbps token-ring adapter) is installed in the first available location starting at location 15.

Table 3-3 shows the card locations for AEAs and CCAs.

Table 3-3. Card Location for AEAs and CCAs.

Card Type	Name	HG	Card Location— Models 21L, 21R, and 23R	Card Location— Model 22L
9311	AEA 1	21	Location 11	Location 12
9311	AEA 2	22	Location 12	Location 13
9311	AEA 3	23	Location 13	Location 14
9263 or 9267	CCA 1	51	First available location above any AEAs that are installed.	First available location above any AEAs that are installed.
9263 or 9267	CCA 2	52	First available location above any AEAs and the first CCA that is installed.	First available location above any AEAs and the first CCA that is installed.

Note: The AEAs and CCAs must occupy the lowest card locations. CCAs that are already installed must be moved if AEAs are installed or removed, or if only the lower of two CCAs is removed.

If you have one CCA, it is assigned to hardware group 51. If you have two CCAs, the one in the lowest slot location is assigned to hardware group 51 and the second one to hardware group 52.

If you have two CCAs which are not of the same card type (one is a 9263 and the other is a 9267), the site planner will assign one of them to hardware group 51 and one to hardware group 52. Since the hardware group depends on the card location, you will have to be sure the correct card type of CCA is installed in each card location. Check with the site planner or read the cabling worksheets in *3174 Site Planning* to determine which card type of CCA to install in each card location.

Storage Card Installation Restrictions: The storage cards for the Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R must be installed in the locations as shown in Table 3-4 on page 3-8. Any other combinations cause status errors.

Repair Information

Table 3-4. Storage Card Plugging

Total Storage	Location	
	J22	J23
2MB	9482	----
3MB	9482	9486
4MB	9482	9482
6MB	9482	9493
6MB	9497	----

1. Place the power switch in the off position.
2. See Figure 3-5 on page 3-9 below. Turn the thumbscrews at the right and left ends of the card counterclockwise.
3. Pull the card forward to remove it from the logic board.
4. To replace, insert the card into the rail guide, with the guide rib to the bottom, and slide the card in until it bottoms. If the card has spring-loaded thumbscrews, push the card into the location until the connector on back is firmly seated. See Figure 3-5 on page 3-9.
5. Turn the right and left thumbscrews clockwise at the same time until they are finger tight to ensure proper card seating and grounding.

Note: If one thumbscrew is tightened first and then the other is tightened, the logic card pins can be damaged.

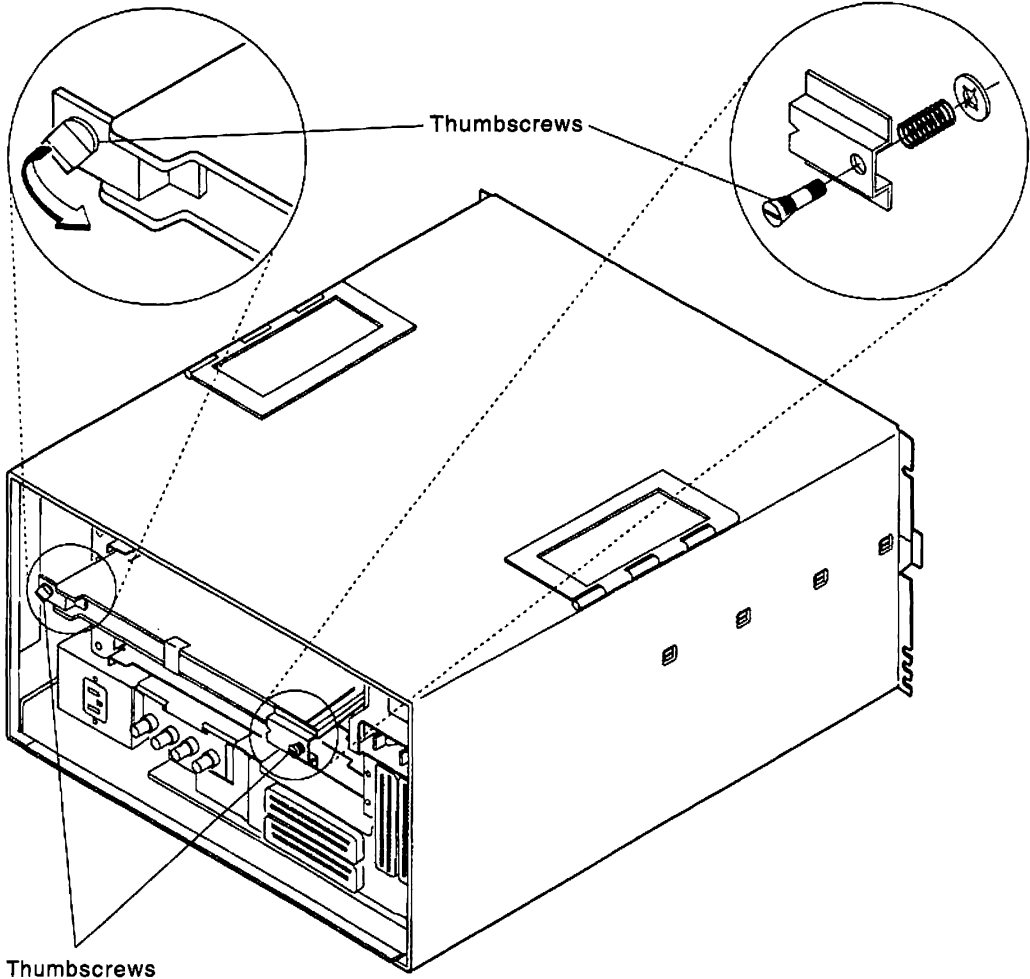


Figure 3-5. Card Removal/Replacement (Thumbscrews)

Note: The preceding illustration shows two different kinds of thumbscrews. The cards in your controller may have either type of thumbscrew. All cards have the same kind of thumbscrew on both sides.

Repair Information

Storage Card Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See “How to Take the 3174 Model 21L Offline” on page 2-290 or “How to Take the 3174 Model 22L Offline” on page 2-291.

1. Place the power switch in the off position and remove power cord.
2. Remove the front decorative panel.
3. Remove the four thumbscrews that hold the customer access panel and remove the panel.
4. Unscrew the two retaining screws on the storage card and remove the storage card. Figure 3-6 shows the location of the storage cards on the planar board.
5. To replace the storage card, insert into the socket with the key slot toward the front. Tighten the two retaining screws, one-half turn at a time so as not to damage the socket.
6. Reverse the steps and the actions to reposition the customer access panel.

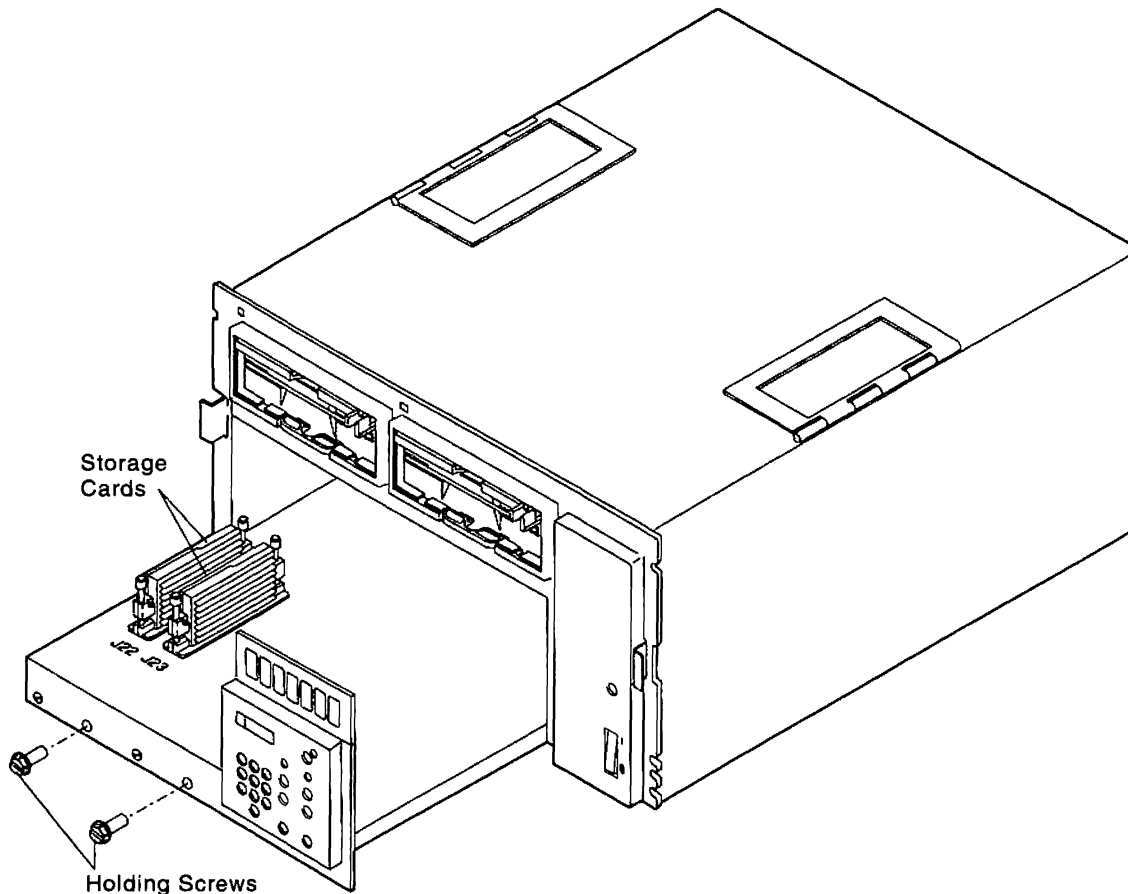


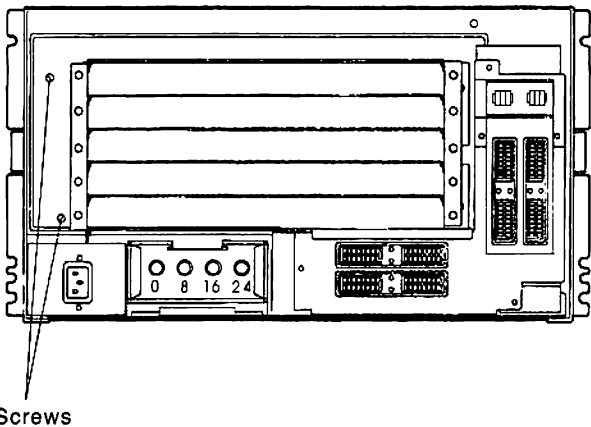
Figure 3-6. Storage Card Removal/Replacement

Note: It is not necessary to pull the planar out of the 3174. It is shown in this figure only for clarity.

Power Supply Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See “How to Take the 3174 Model 21L Offline” on page 2-290 or “How to Take the 3174 Model 22L Offline” on page 2-291. Place the 3174 offline before you switch power off.

1. Place the power switch in the off position.
2. Remove the AC power cable at the rear of the power supply. See Figure 3-7.
3. Remove the decorative panel on the 3174.
4. Remove the two screws in the rear of power supply.
5. Remove the power supply by pulling it out the front of the 3174.
6. Reverse the steps and the actions to replace the power supply.



Screws

Figure 3-7. Power Supply Removal

Repair Information

Planar Board Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

1. Place the power switch in the off position and disconnect the power plug.
2. Remove the decorative panel from the 3174.
3. Remove the four thumbscrews that hold the customer access panel and remove the panel.
4. On the Model 21L, set the priority switches to bypass position. See "Priority Switches" on page 4-2. Then remove the channel tailgate assembly. On the Models 21R, 22L, and 23R, remove the Communication Adapter cable.
5. Label the coax cable connectors and disconnect them from the Terminal Adapter.
6. Remove the two hex head screws in the lower front of the planar board. See Figure 3-8 on page 3-13.
7. Pull the planar assembly out of the front of the 3174.
8. Remove the operator panel and storage cards from the planar board being replaced and install them on the new planar board in the same locations as on the old planar board.
9. Reverse the steps and the actions to replace the planar board.

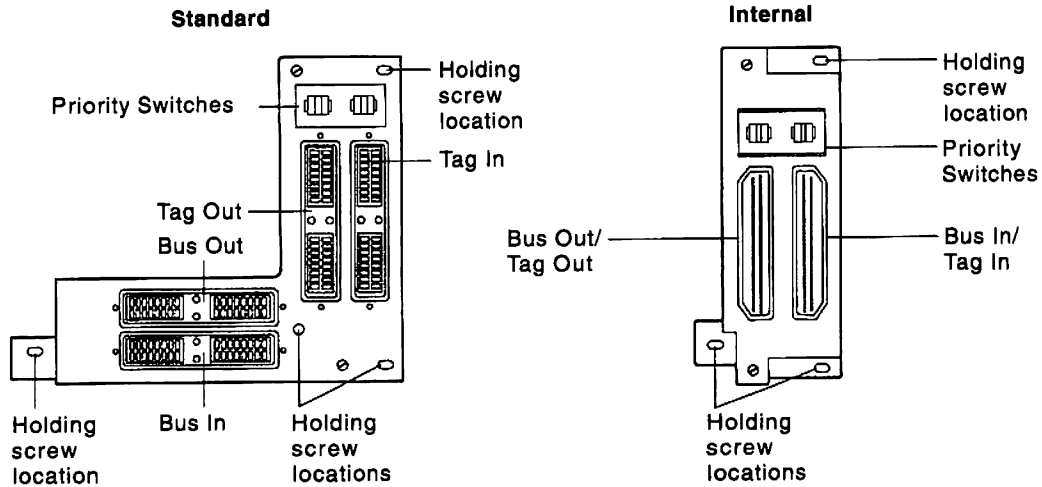
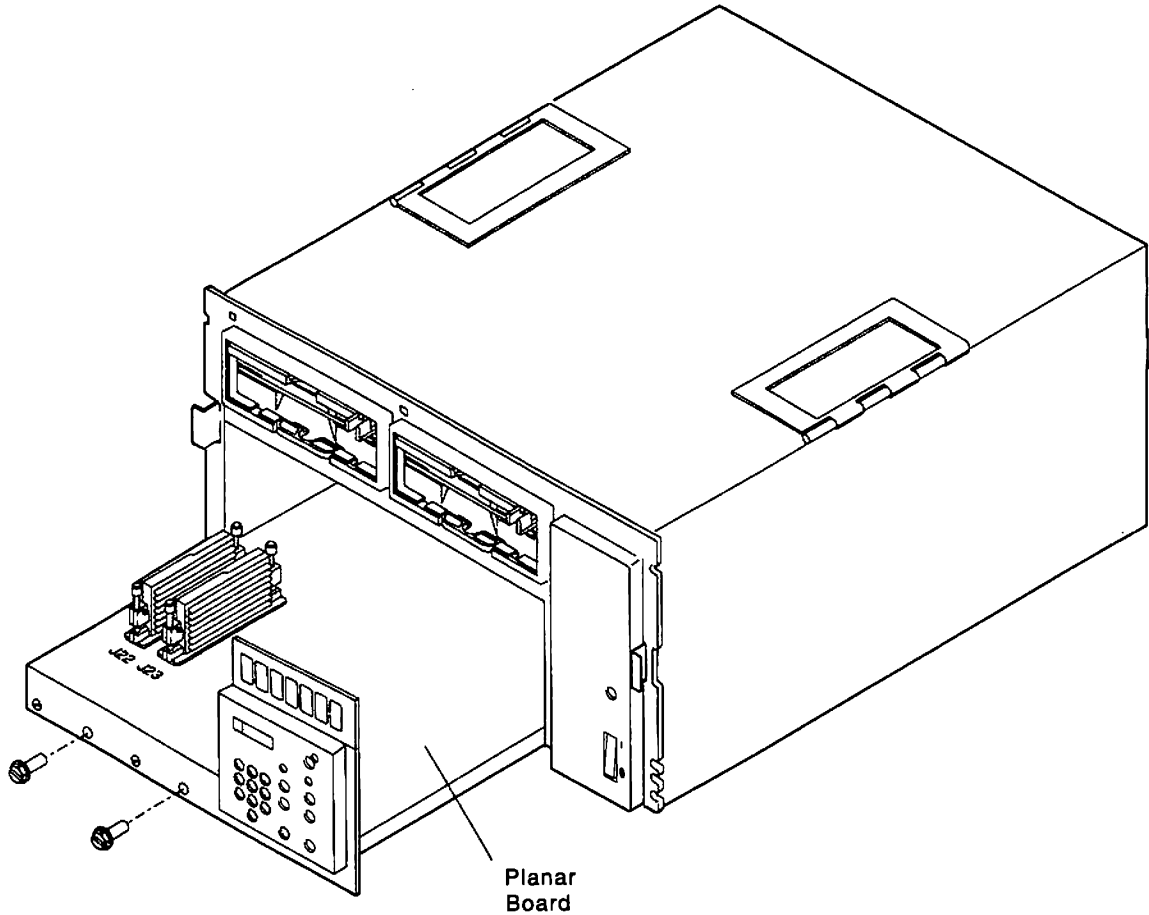


Figure 3-8 (Part 2 of 2). Planar Removal

Repair Information

Operator Panel Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291. Place the 3174 offline before you switch power off.

1. Place the power switch in the off position and remove the power cord.
2. Remove the decorative panel.
3. Remove the four thumbscrews that hold the customer access panel and remove the panel.
4. Reach into the customer access area and squeeze the operator panel retaining clips toward each other and pull the operator panel straight out.
5. To replace the operator panel, align the flange on the operator panel with the slot in the planar front cover and push until the connector aligns and latches; then reverse the above steps.

Note: The operator panel overlay must be replaced and ordered separately.

Fan Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291. Place the 3174 offline before you switch power off.

To remove the rear fan (F2):

1. Place the power switch in the off position and disconnect the power cord.
2. **For Model 21L:** Set the priority switches to the bypass position. See "Priority Switches" on page 4-2. Then remove the channel tailgate assembly.
For Models 21R, 22L, 23R: Remove the fan cover on the right end of the 3174 (looking from the rear).
3. Slide the fan (F2) to the rear and disconnect the cable. See Figure 3-9 on page 3-15.
4. Reverse the steps and the actions to replace the fan.

Warning: Be sure that fan F2 is installed with the airflow into the the controller. See Figure 3-9 on page 3-15 for an illustration.

To remove the fan on the planar board (F1):

1. Place the power switch in the off position and disconnect the power cord.
2. Remove the front panel.
3. Remove the planar board. See steps 1 through 8 in "Planar Board Removal/Replacement" on page 3-12.
4. Remove the two screws holding the front fan (F1) to the planar board. Disconnect the fan cable.
5. Reverse the steps and the actions to replace the fan.

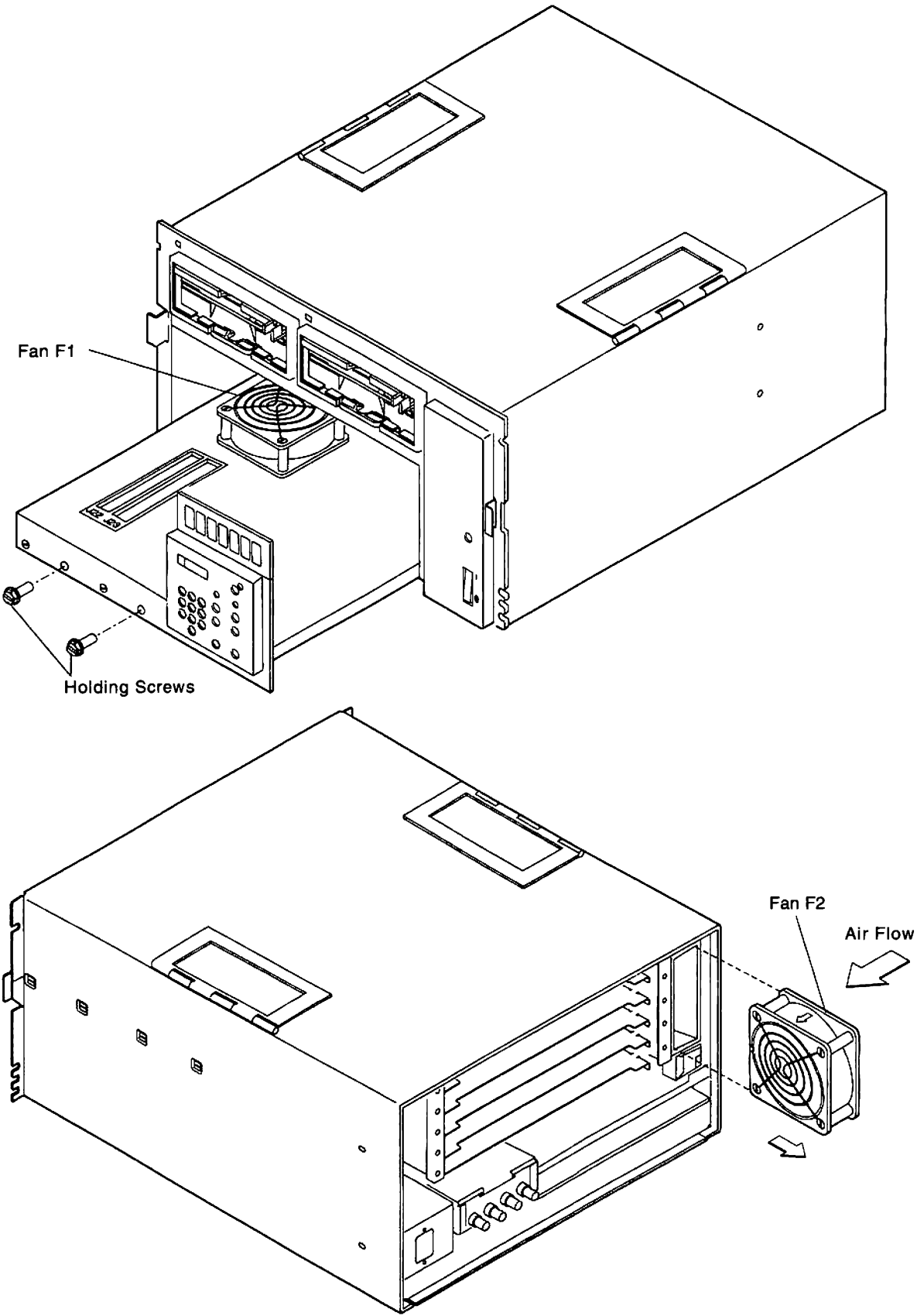


Figure 3-9. Fan Removal

Repair Information

Diskette Drive Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291. Place the 3174 offline before you switch power off.

1. Place the power switch in the off position and disconnect the power cord.
2. Remove the decorative panel.
3. Remove the four thumbscrews that hold the customer access panel and remove the panel.
4. Remove the thumbscrew beneath the diskette drive. It is on the left side under the diskette drive.
5. Using the holding tab, pull the diskette drive forward to remove it.
6. Reverse the steps and the actions to replace the diskette drive.

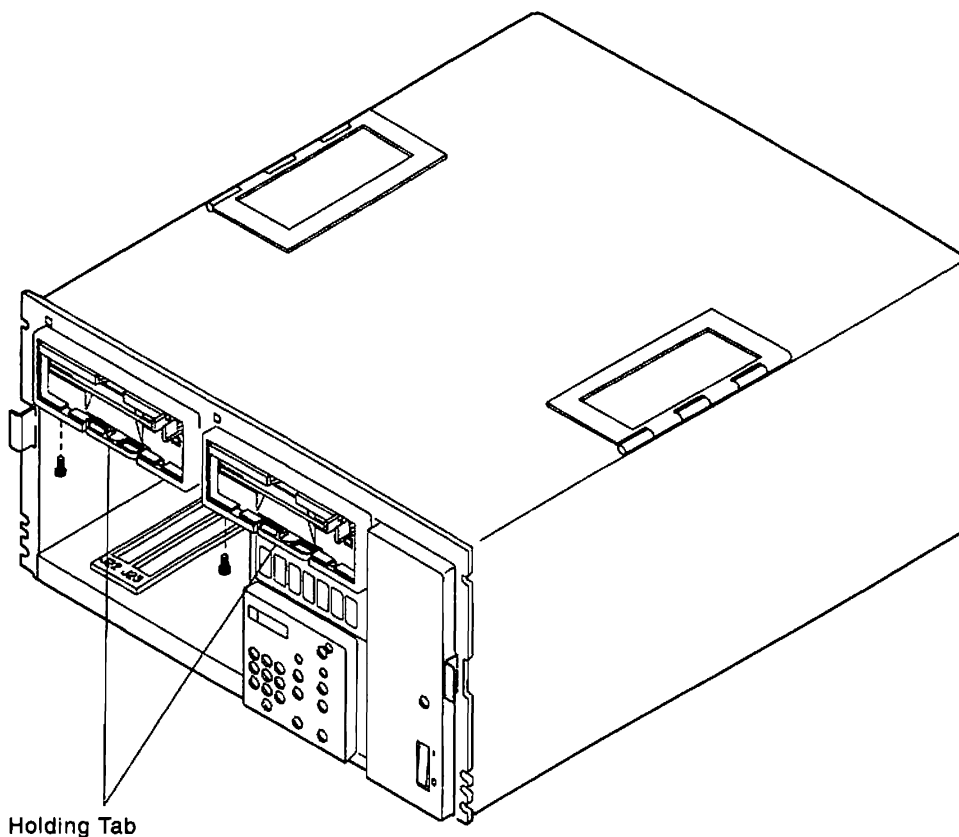
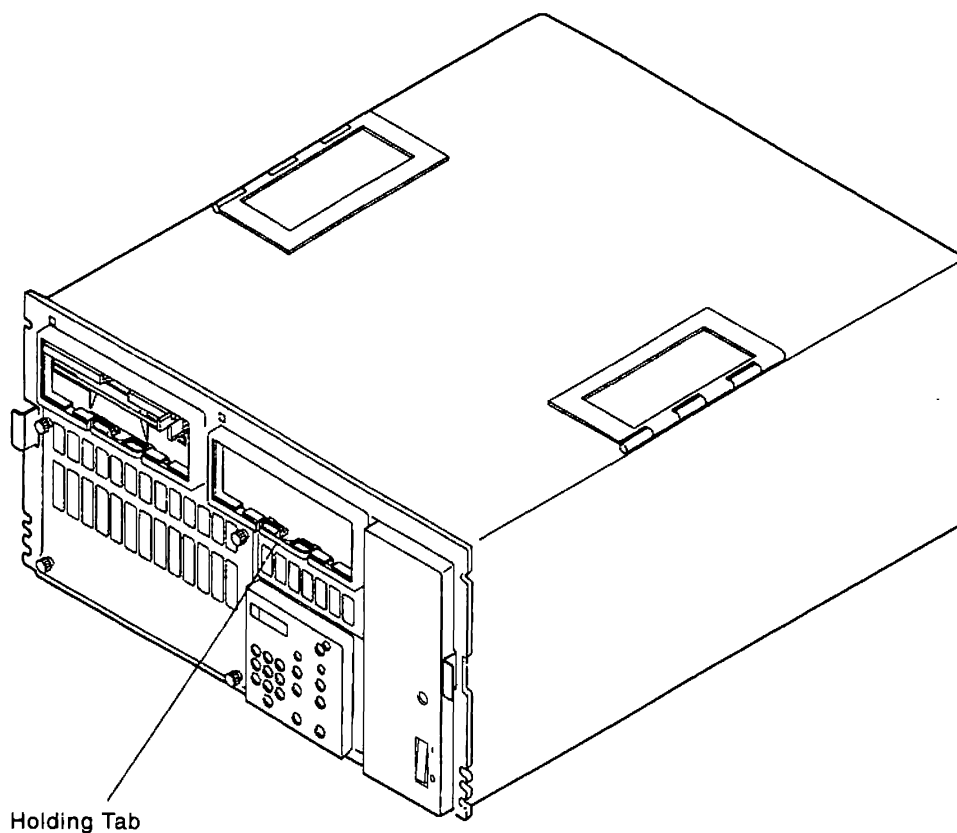


Figure 3-10. Diskette Drive Removal

Fixed Disk Drive Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291. Place the 3174 offline before you switch power off.

1. Remove the decorative panel.
2. To prevent damage to the fixed disk and heads, if possible perform an Alt 2 IML from a diskette to park the heads. See "Alt 2 IML Procedures (Test 82)" on page 1-43.
3. Place the power switch in the off position and disconnect the power cord.
4. Remove the four thumbscrews that hold the customer access panel and remove the panel.
5. Remove the thumbscrew beneath the fixed disk drive. It is on the left side under the fixed disk drive.
6. Using the holding tab, pull the disk drive forward to remove it.
7. Reverse the steps and the actions to replace the disk drive.
8. If the fixed disk is replaced, run "CSU Surface Scan (FN 51)" on page 2-114.



Holding Tab

Figure 3-11. Fixed Disk Removal

Repair Information

Bus/Tag Tailgate Assembly Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. Place the 3174 offline before you switch power off. See "How to Take the 3174 Model 21L Offline" on page 2-290 or "How to Take the 3174 Model 22L Offline" on page 2-291.

1. Place the power switch in the off position and disconnect the power cord.
2. Record the priority switch settings.
3. See "How to Disconnect the Bus and Tag Cables" on page 2-292, then remove the channel interface cables. If present, remove the bus and tag terminator assemblies.
4. Remove the holding screws and pull the bus/tag assembly out of the 3174 until it is disconnected from the planar board.
5. Reverse the steps and the actions to replace the tailgate assembly.
6. Ensure the priority switches are set correctly.

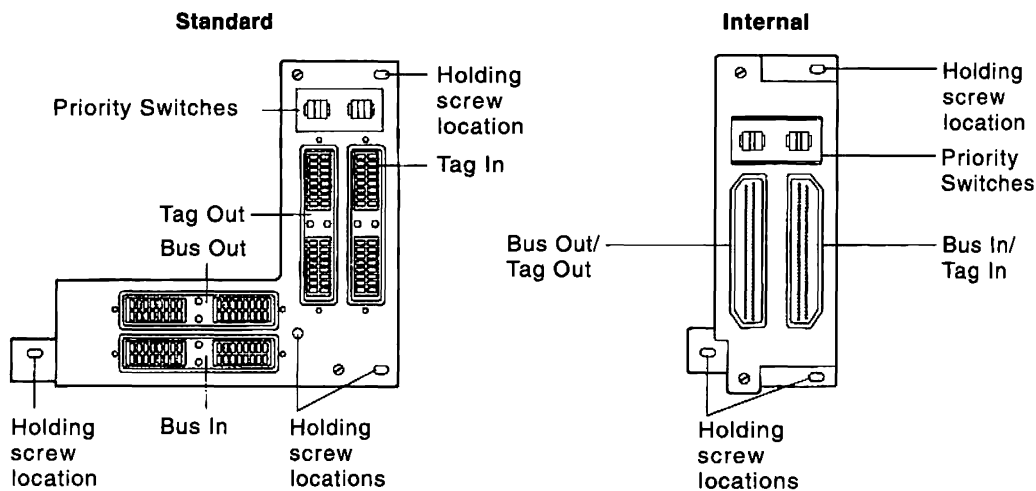


Figure 3-12. Tailgate Assembly Removal

Logic Board Removal/Replacement

Warning: To prevent interruption of the host system, notify the host operator to deactivate the controller. See “How to Take the 3174 Model 21L Offline” on page 2-290 or “How to Take the 3174 Model 22L Offline” on page 2-291. Place the 3174 offline before you switch power off.

1. Place the power switch in the off position and remove the power cord from the AC power source. Disconnect the power cord from the 3174.
2. Label and disconnect all cables from the rear of the 3174.
3. If it is a Model 22L, remove the fiber optic cable strain relief clamp. See Figure 3-14 on page 3-20 for the location of the strain relief clamp.
4. Remove the front decorative panel.
5. Remove the machine from the rack.
6. Remove the tailgate assembly if it is a Model 21L. See “Bus/Tag Tailgate Assembly Removal/Replacement” on page 3-18.
7. Remove the tailgate mounting bracket if it is a Model 21L, or the fiber optic cable strain relief base if it is a Model 22L, from the right rear inside of the cabinet by removing the two outside mounting thumbscrews. Figure 3-14 on page 3-20 shows a detailed view of the strain relief.
8. Remove the rear fan retainer bracket, if it is a Model 21R, 22L, or 23R.
9. Disconnect the fan power cable by removing the retainer clip and unplug the in-line connection.
10. Remove the fan from the plenum. See “Fan Removal/Replacement” on page 3-14.
11. Remove all blank cards and feature cards from the card cage.
12. Remove the two power supply mounting screws. See “Power Supply Removal/Replacement” on page 3-11.
13. Remove the power supply. See “Power Supply Removal/Replacement” on page 3-11.
14. Remove the four thumbscrews that hold the customer access panel in place and remove the panel.
15. Remove the planar assembly. See “Planar Board Removal/Replacement” on page 3-12.
16. Remove disk drive 1 and disk drive 2 if present. See “Diskette Drive Removal/Replacement” on page 3-16.
17. Remove the logic board assembly from the cabinet by removing five screws. See Figure 3-13 on page 3-20.
18. Remove the plenum from the side of the card cage by removing two screws. See Figure 3-13 on page 3-20.
19. Remove the card cage from the logic board by removing four screws. See Figure 3-13 on page 3-20.
20. To replace the logic board see “Installing the logic board” on page 3-21.

Repair Information

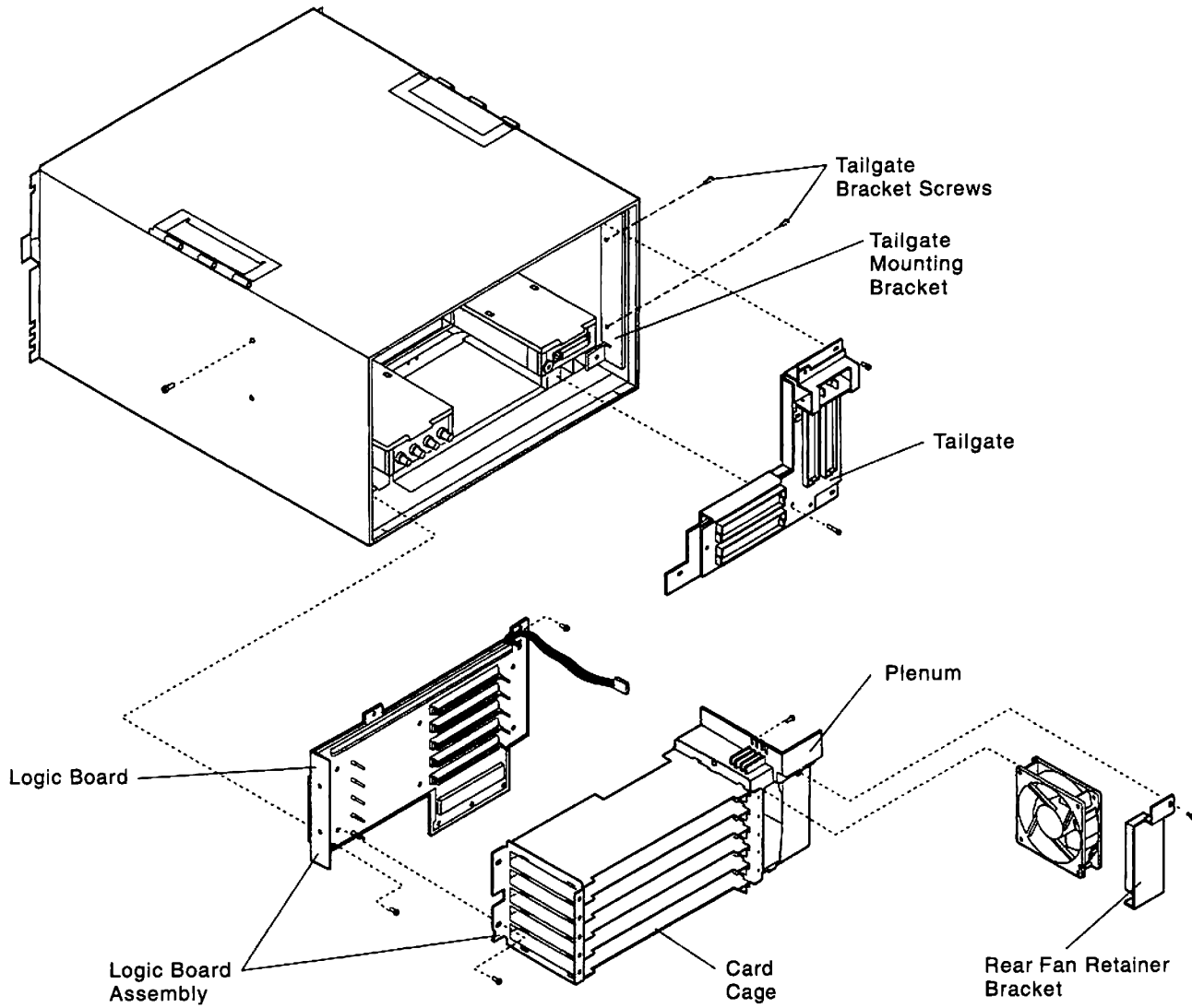


Figure 3-13. Logic Board Removal

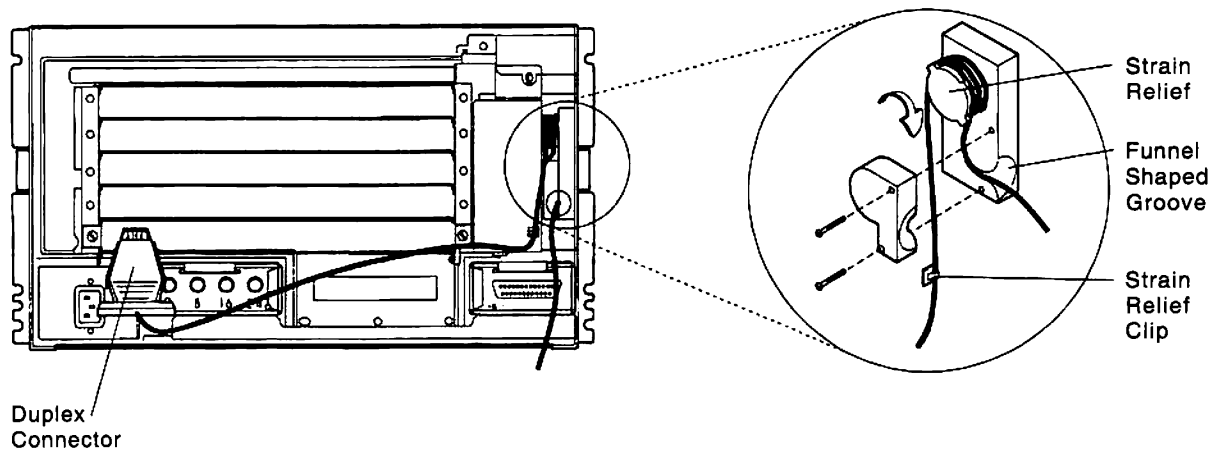


Figure 3-14. Fiber Optic Cable Strain Relief

Installing the logic board

1. Use four screws to mount the card cage to the logic board with the copper grounding fingers visible on the bottom left.
2. Mount the plenum to the side of the card cage with two screws.
3. Install the logic board assembly in the cabinet with five screws. Be sure the fan wire is accessible from the front of the 3174. Install and tighten the one bottom and two top screws inside the cabinet. Next install the two screws through the cabinet wall, leaving them loose at this time.
4. Install the power supply into the cabinet and plug it into the logic board. Tighten the two outside logic board screws.
5. Install the planar assembly.
6. Install the disk drive(s).
7. Install the customer access panel.
8. Install the two retainer screws through the logic board into the rear of the power supply. Tighten the screws finger-tight only.
9. Install the logic cards, and any blank cards, into the card cage. Complete tightening of the retainer screws.
10. Install the fan into the plenum so that the fan wire connector is facing out from the lower left corner.
11. Connect the power cable from the fan to the end from the logic board. Snap the cable retainer clip over the two in-line connectors.
12. Install the fan retainer bracket with one screw, if it is a Model 21R, 22L, or 23R.
13. Install the tailgate mounting bracket if it is a Model 21L. Leave the two screws loose at this time.
14. Mount the tailgate (Model 21L) by plugging the connector on the rear to the connector on the right rear of the planar assembly. Install and tighten the screw into the right rear of the planar assembly. If the tailgate is the L shape type, install the screw on the far left into the rear of the planar assembly. Install the two screws into the tailgate mounting bracket. Tighten the two outside tailgate mounting bracket screws.
15. Install the fiber optic cable strain relief base, if it is a Model 22L.
16. Install the machine into the rack and tighten the mounting screws.
17. Install the front decorative panel.
18. Connect cables to the logic cards and the tailgate if it is a Model 21L. If it is a Model 22L, route the fiber optic cable through the strain relief base and install the clamp.
19. Plug the power cord into the rear of the power supply and AC power source. Power up and run an Alt 2 IML to confirm machine operation.

Chapter 4. Connecting a Model 21L to a Host Channel

Introduction	4-2
Installation Procedure	4-2
Controller Channel Priority	4-2
Priority Switches	4-2
UCW Settings	4-4
Connecting Bus/Tag Channel Cables	4-5
Channel Attachment Information	4-8

Introduction

This chapter contains the information you need to complete the installation of a 3174 Establishment Controller Model 21 by connecting the 3174 to a channel. Customer setup and configuration should be done by the customer before you perform the channel installation procedure. If you are not familiar with attaching controllers to a channel, review the section “Channel Attachment Information” on page 4-8.

Installation Procedure

Installing a 3174 requires setting the priority switches and connecting the channel interface cables.

1. Set the priority switches. See Table 4-1.
2. Connect the channel interface cables. See “Connecting Bus/Tag Channel Cables” on page 4-5.
3. Check the UCW settings. See “UCW Settings” on page 4-4.

Note: The channel driver/receiver wrap test should be performed before you connect the controller to the host channel. To perform this test, you need a set of standard channel wrap blocks P/N 4299873 and 6246339, or 53F7816 for internal channels. These wrap blocks are obtained through normal parts distribution. The wrap blocks are normally installed in the 3174 tailgate. They can also be connected to the ends of the Bus In and Tag In channel cables to verify that the cables are working correctly. See “How to Run the Channel Driver/Receiver Wrap Test (FN 01)” on page 2-123.

Controller Channel Priority

Controller priorities on the channel interface are determined by the order of attachment to the channel tag signals Select Out and Select In. These signals form a loop from the channel through each controller and back. Setting the switches to “high priority” attaches the controller selection circuitry to Select Out. Setting the switches to “low priority” attaches the controller selection circuitry to Select In. Setting the switches to “bypass” disconnects the controller selection circuitry from the channel. If the 3174 is used to drive a host system console, the controller should be given the highest priority on the channel. Consult the account systems engineer if you are in doubt about the proper setting of the switches for your particular channel configuration.

Priority Switches

The 3174 comes from the factory with the priority switches set to *high priority*. To verify or change the switch settings, see Table 4-1 and Figure 4-1 on page 4-3.

Table 4-1. Priority Switch Settings

Switch	High	Low	Bypass	Illegal
1 (SW1)	Right	Left	Left	Right
2 (SW2)	Right	Left	Right	Left

The switch settings are described below:

High: This serial passing of the incoming selection signal (Select Out) enables the 3174 to be logically connected to the channel before low-priority controllers.

Low: This serial passing of the outgoing signal (Select In) enables the 3174 to be logically connected to the channel after high-priority controllers.

Bypass: The selection signal is not allowed to logically select the 3174. This is used when the planar board is removed.

Illegal: Do not use this setting. Host problems can occur.

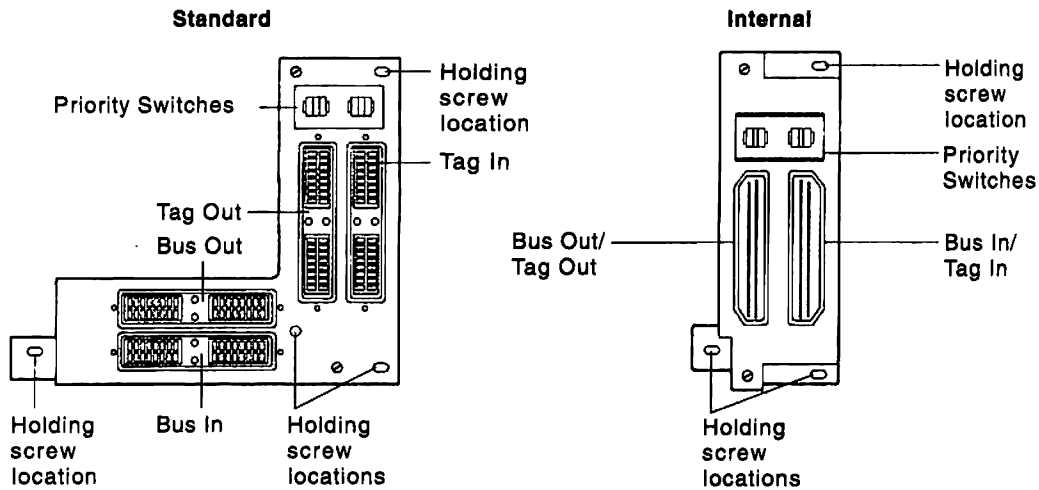


Figure 4-1. Tailgate Assembly with Priority Switches

Installing on a Channel

UCW Settings

The recommended UCW settings for shared or nonshared mode of operation are:

- Shared = Yes (Configuration question 101=4)
- Shared = No (Configuration question 101=5).

See Table 4-2 or Table 4-3 to select the proper UCW setting that applies to the host system and 370 mode being used.

Table 4-2. UCW Settings (370 Mode)

Controller	Channel	UCW Setting
3174 21L SNA (Single Address)	Byte or Block	Nonshared
3174 21L Non-SNA (Multiple Address)	Byte or Block	Shared
3174 21L with Token-Ring	Byte or Block	Shared

Table 4-3. UCW Settings (370 XA Mode)

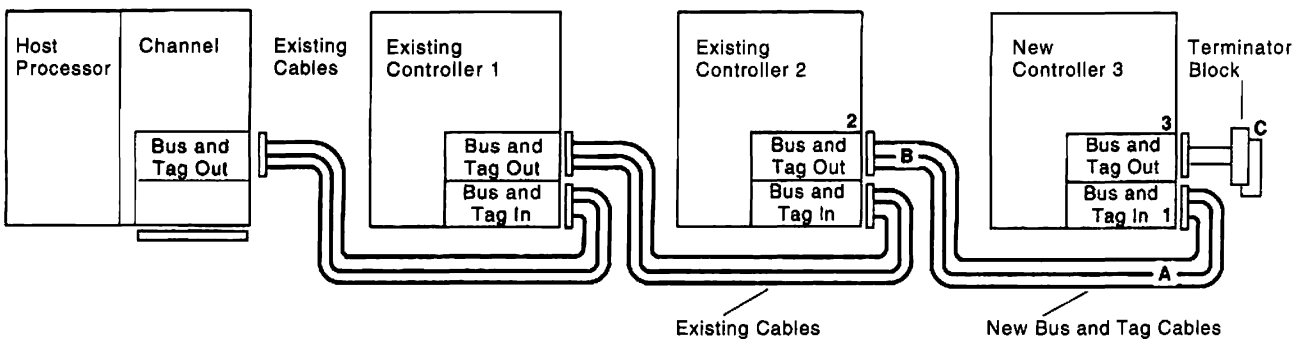
Controller	Channel	UCW Setting
3174 21L SNA (Single Address)	Byte or Block	Nonshared IOCP (Shared = N)
3174 21L Non-SNA (Multiple Address)	Byte Block	IOCP (Shared = N) IOCP (Shared = YB)
3174 21L with Token-Ring	Byte Block	IOCP (Nonshared = N) IOCP (Shared = YB)

Note: If you are installing a Model 22L, the UCW setting should be IOCP=S. For more information, refer to *ES/9000 and ES/3090 Input/Output Configuration Program User Guide*.

Connecting Bus/Tag Channel Cables

Depending on the channel configuration, use one of the following figures to connect the bus/tag channel cables:

- Figure 4-2 for installing a 3174 on end-of-channel
- Figure 4-3 on page 4-6 for replacing an existing 3274
- Figure 4-4 on page 4-7 for installing a 3174 on other than end-of-channel.



Note: The same cable connector colors should never be connected together. For example: the light-gray cable ends go to the dark-gray receptacles in the controller; the dark-gray cable ends go to the light-gray receptacles in the controller.

Figure 4-2. Adding a 3174 on End-of-Channel

Warning: Ensure that the processor/channel state permits removal of the block with no adverse effect before you remove any terminator block from an existing controller. To prevent interruption of the host system, notify the host operator to press Stop at the host computer console.

1. Connect *new* Bus and Tag cable ends **A** to 3174 Bus and Tag In receptacles **1**.
2. Remove terminator blocks **C** from existing controller Bus and Tag out receptacles **2** if installed.
3. Connect new Bus and Tag cable ends **B** to existing controller Bus and Tag Out receptacles **2**.
4. Connect terminator blocks **C** to 3174 Bus and Tag Out receptacles **3**.

Installing on a Channel

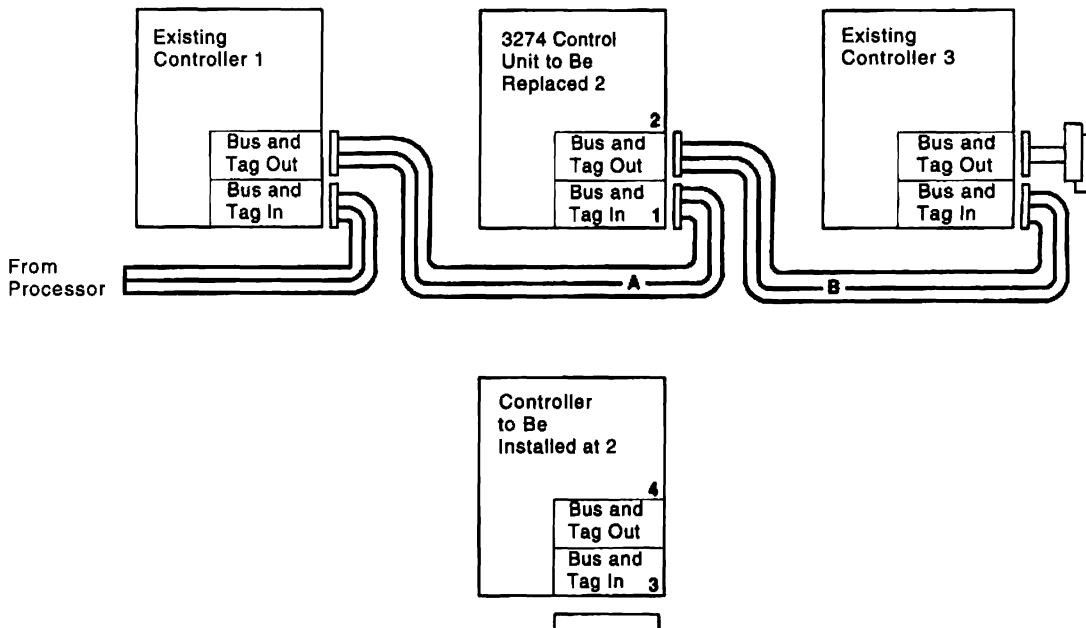
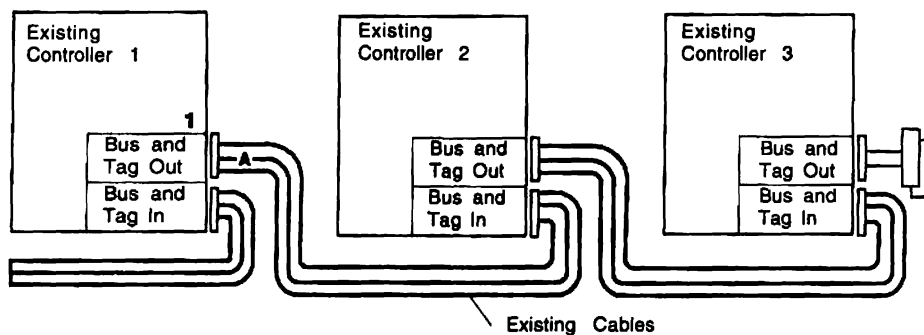


Figure 4-3. Replacing an Existing 3274 on a Channel Interface

Warning: Ensure that the processor/channel state permits removal of the cables before you remove any Bus and Tag cables from an existing controller. To prevent interruption of the host system, notify the host operator to press Stop at the host computer console.

1. Remove existing Bus and Tag cable ends **A** from 3274 Bus and Tag In receptacles **1**.
2. Remove existing Bus and Tag cable ends **B** from 3274 Bus and tag Out receptacles **2**.
3. Move the 3274 away from the opening in the raised floor, and position the 3174 near enough to the opening to connect the cables in the following steps.
4. Connect existing Bus and Tag cable ends **A** to the 3174 Bus and Tag In receptacles **3**.
5. Connect existing Bus and Tag cable ends **B** to the 3174 Bus and Tag Out receptacles **4**.

Note: Bus and Tag Out and Bus and Tag In receptacles can vary from controller to controller.



Note: Bus and Tag Out and Bus and Tag In receptacle locations may vary from controller to controller.

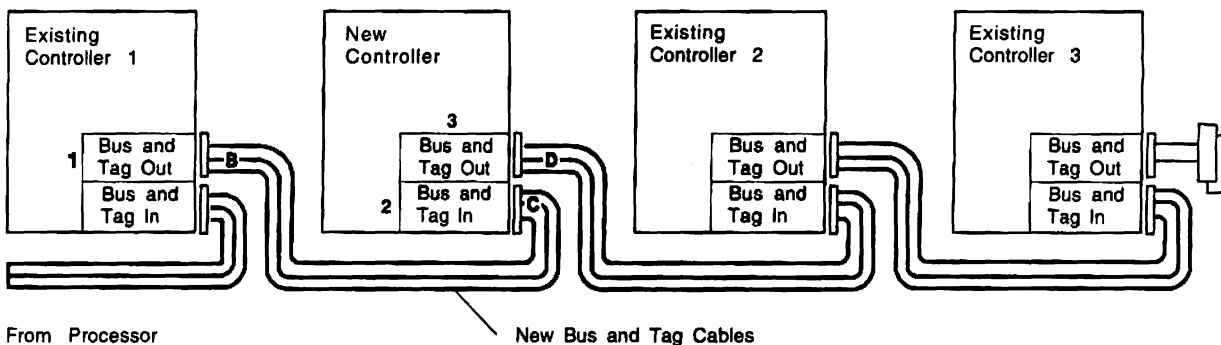


Figure 4-4. Adding a 3174 not on the End-of-Channel

Warning: Ensure that the processor/channel state permits removal of the cables before you remove any Bus and Tag cables from an existing controller. To prevent interruption of the host system, notify the host operator to press Stop at the host computer console.

1. Remove existing Bus and Tag cable ends **A** from existing controller 1 Bus and Tag Out receptacles 1.
2. Connect *new* Bus and Tag cable ends **B** to existing controller 1 Bus and Tag Out receptacles 1.
3. Connect *new* Bus and Tag cable ends **C** to 3174 Bus and Tag In receptacles 2.
4. Connect existing Bus and Tag cable ends **D** to 3174 Bus and Tag Out receptacles 3.

Channel Attachment Information

Table 4-4 is a matrix of the customizing parameters and host systems for which the 3174 Model 21 are supported. The customizing parameters are described in Chapter 3 of the *3174 Planning Guide*, GA27-3862. The matrix applies to SNA and non-SNA attachments.

Table 4-4. Host-Channel Customizing Parameters

Host System and Channel Type	Controller Address (Q 104)	Upper Limit Address (Q 105)	Command Retry (Q 222)	Data Transfer Mode (Q 224)	Channel Burst Size (Q 225)
4341 Byte Multiplexer	Note 1	Note 1	Yes. Note 2	High-Speed Transfer Note 3	32 Note 4
4341 Block Multiplexer	Note 1	Note 1	Yes Note 2	High Speed Transfer Note 3	NA Note 4
4361 Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
4361 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
4381 Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
4381 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
308X Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
308X Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
3090* Byte Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	32 Note 4
3090 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4
9370 Block Multiplexer	Note 1	Note 1	Yes Note 2	High-Speed Transfer Note 3	NA Note 4

Notes:

1. Controller Address

In SNA mode (configuration question number 101 = 5), a single address is specified during configuration. The individual device addresses are contained in the SNA data stream.

In non-SNA mode (configuration question number 101 = 4), multiple addresses are assigned in a contiguous range, to a maximum of 32. If a device address is configured but no device is physically connected to the 3174 port, then the 3174 microcode identifies to the channel adapter card that the device is unavailable. If the channel attempts an operation to the unavailable device, the controller returns unit-check status and intervention-required sense.

2. Command Retry

If command retry is enabled, the 3174 initiates a retry request for all Bus Out parity checks detected during write data transfer sequences.

3. Data Transfer Modes

The channel adapter in the 3174 can transfer data in two different modes:

- Data Chained Interlocked (DCI)
- High-Speed Transfer (HST).

No requirements exist for special channel cabling, plugging, or physical installation setup as a result of choosing one data transfer mode over another.

- DCI – Interlocked single tag
- HST – Interlocked double tag.

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

4. Channel Burst Size

The 3174 transfers data in an interlocked mode at a rate of 1.25 megabytes, or 0.8 microsecond per byte. The channel burst size default value for the 3174 is 32. The consequences of specifying larger burst sizes can be determined only by calculating the critical wait times of other control units and devices attached to the same byte multiplexer channel. Exceeding the wait times of the other devices may cause them to overrun and/or otherwise degrade their performance. Consult with the account systems engineer if you suspect the burst size is not set correctly.

The burst size selected for operation on a block multiplexer channel does not affect the data transfer rate because a block channel forces burst mode.

Chapter 5. Safety Inspection Guide

Introduction	5-2
Preparation	5-2
General Checklist Guidelines	5-2

Introduction

This chapter is a guide to inspecting 3174 Establishment Controller Models 21H, 21L, 21R, 22L, 22R, 23R, and 24R for potentially unsafe conditions. It provides a list of preparatory items, a checklist of inspection items, and an illustration of safety labels.

Preparation

- Completion of *Electrical Safety Training Course for IBM Customer Engineers* is required (Self-Study Course 77170, or FIS II Course 70702, or the current level of each).
- Machine power should be off and electrical power removed from the machine before you begin the checklist.
- The following should be available for reference:
 - Copies of CEMs (ECAs and SAs) for this machine type
 - *3174 Site Planning, GA23-0213*
 - *Electrical Safety for IBM Customer Engineers, S229-8124.*

Note: Although completeness and accuracy are the goals of this guide, not all machine configurations (for example, special features, RPQs) are covered. If you encounter a machine with RPQs or features not described in this guide, use the installation instructions for the RPQ or feature for additional information. Otherwise, use this guide and good judgment to obtain a safe machine.

General Checklist Guidelines

The intent of this inspection guide is to help you identify potentially unsafe conditions on machines being inspected. Each machine, at the time of its manufacture, had required safety items installed to protect the owners/operators and service personnel from injury. This checklist covers only those items. Use good judgment to identify potential safety conditions not covered by this inspection guide.

Complete the following checklist before you bring power up on the machine. If any apparent unsafe conditions are present, determine how serious the hazard could be and whether you should continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical, especially primary power – for example, a frame where electrical potential is above ground potential can cause serious or fatal electrical shock.
- Explosive – for example, a damaged CRT face or bulging capacitors can result in serious injury.
- Use of chemicals, cleaning solutions, or solvents other than those specified by IBM.

Checklist

Checks

- Check that machine power is off and the mainline power cord is disconnected before you start this procedure.
- Check that the power cord 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.
- Those that secure the power supply and feature cards.

Check for Machine Labels

- Verify that labels are installed as indicated in Figure 5-1 on page 5-4.
- Verify that the voltage label matches the voltage stamp on the side and rear of the power supply.

Power Plug Ground Check

With an Ohm meter set to the RX1 range, check continuity between the ground pin on the power plug and the machine frame.

- The reading should be 0 ohms.

Test Verification

Run either of the following tests:

- Test All 81 (CSU). See "Alt 1 Normal IML Procedure" on page 1-41.
- Test 82. See "Alt 2 IML Procedures (Test 82)" on page 1-43.
- Investigate any failure before releasing the machine for customer use.

Safety Inspection

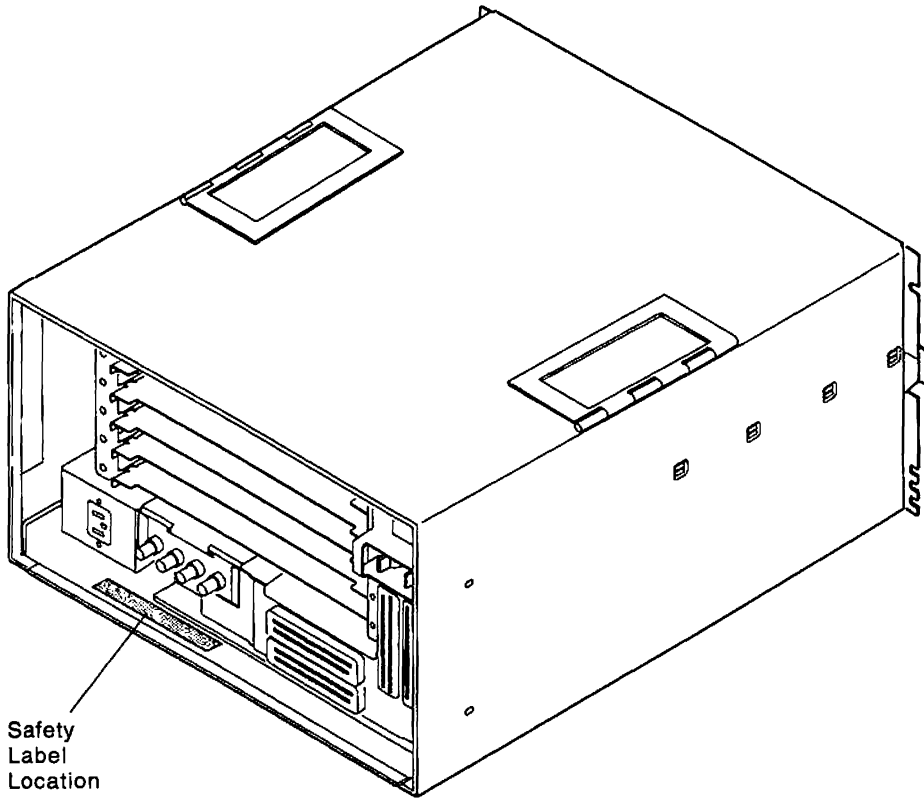


Figure 5-1. Safety Label Location

To obtain the part numbers for the labels installed in the controller, see Chapter 6, "Parts Catalog" on page 6-1.
parts catalog.

Figure 5-2 illustrates the Integrated Services Digital Network (ISDN) Adapter card and highlights the location of the safety label. Figure 5-3 shows a close-up of the label text.

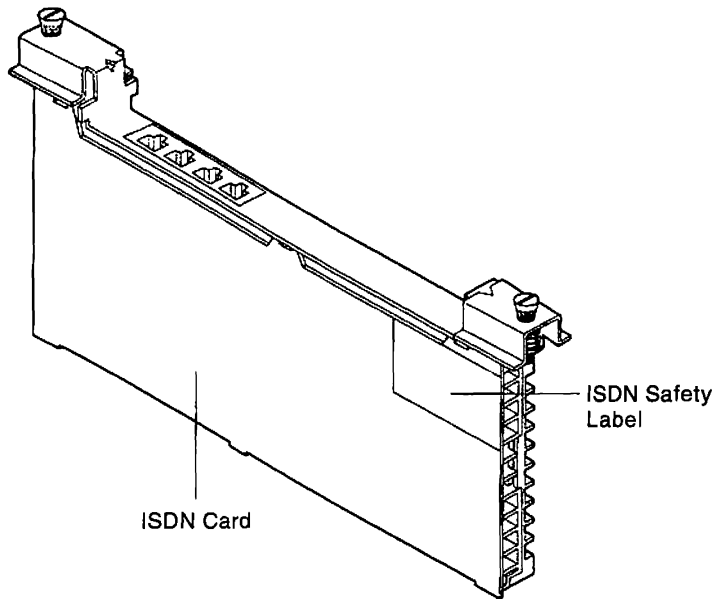


Figure 5-2. ISDN Adapter Card

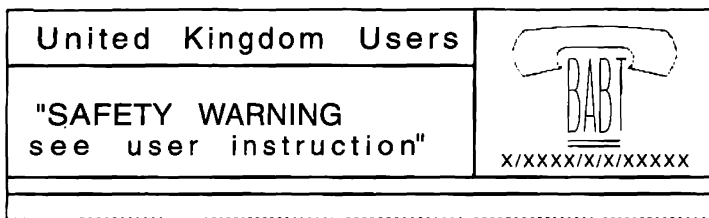


Figure 5-3. ISDN Adapter Card Safety Label

Chapter 6. Parts Catalog

How To Use This Parts Catalog

- **SIMILAR ASSEMBLIES:** If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

- **AR: (As Required)** in the Units column indicates that the quantity is not the same for all machines.

- **NP: (Non-Procurable)** in the Units column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.

- **NR: (Not Recommended)** in the Units column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.

- **R: (Restricted)** in the Units column indicates that the part has a restricted availability.

- **INDENTURE:** The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture	Relationship of Parts
(No dot)	MAIN ASSEMBLY
(One dot)	• Detail parts of a main assembly
(One dot)	• Subassembly of the main assembly
(Two dot)	• • Detail part of a one-dot subassembly
(Two dot)	• • Subassembly of a one-dot subassembly
(Three dot)	• • • Detail part of a two-dot subassembly

Assembly *n*: EXAMPLE ASSEMBLY

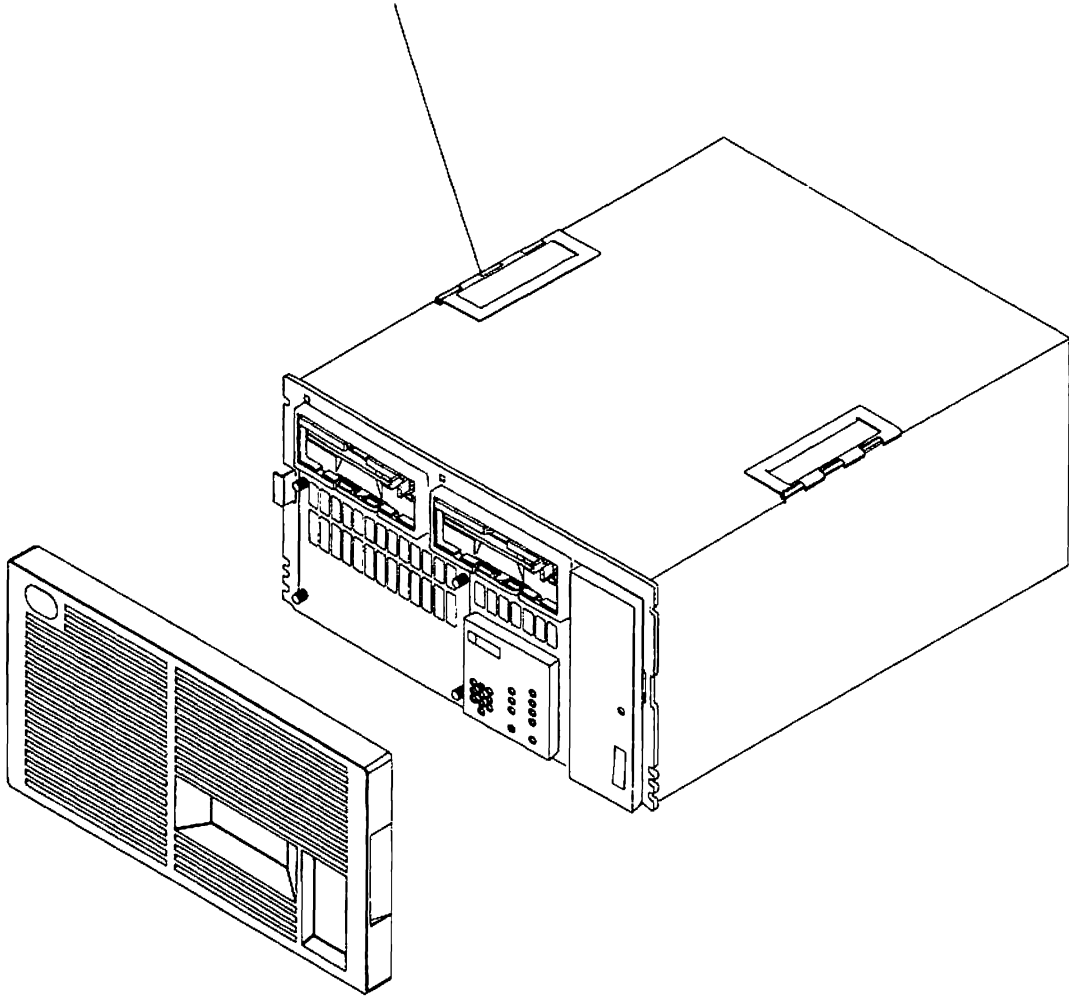
Asm-Index	Part Number	Units	Description
<i>n</i> -		1	Cover Asm.Rear-Red
-		1	Cover Asm.Rear-White
			For Next Higher Assembly, See 1-2
-1	5373637	1	• Seal, Top
-2	5356429	2	• Clip, Retaining
-3	1847630	R	• Finger Stock Asm
-4	1847602	NR	• • Channel, Finger Stock
-5	5373639	AR	• Seal, Bottom
-6	5356429	2	• Clip, Retaining
-7		NP	• Cover, Rear, Without Paint
-8	416629	2	• Screw, Panel

Assemblies

Cable Assemblies With Component Parts	6-10
Final Assembly 3174 Models 21H,21L,21R,22L,23R,24R	6-6

Visual Index I. Final Assembly-3174 Models 21H,21L,21R,22L,23R,24R

Final Assembly - 3174
Assembly 1
Page 6-6

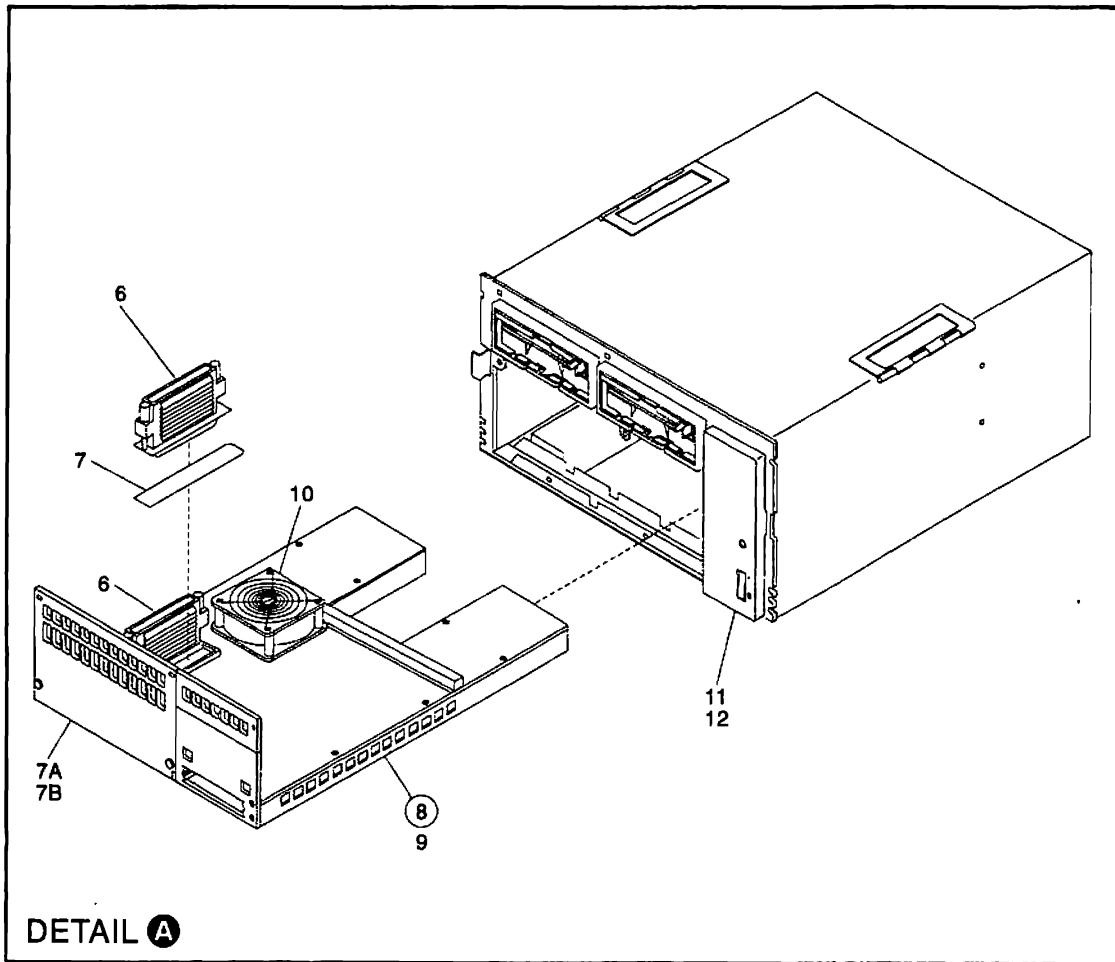
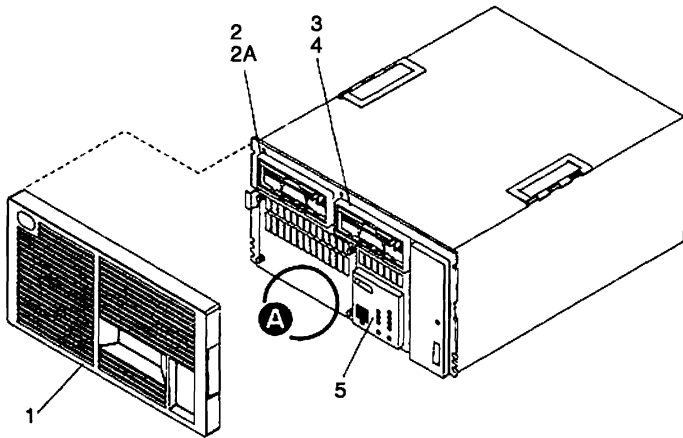


Cable and Line
Cord Assemblies
Assembly 2
Page 6-10

CAM5P003

Catalog Section

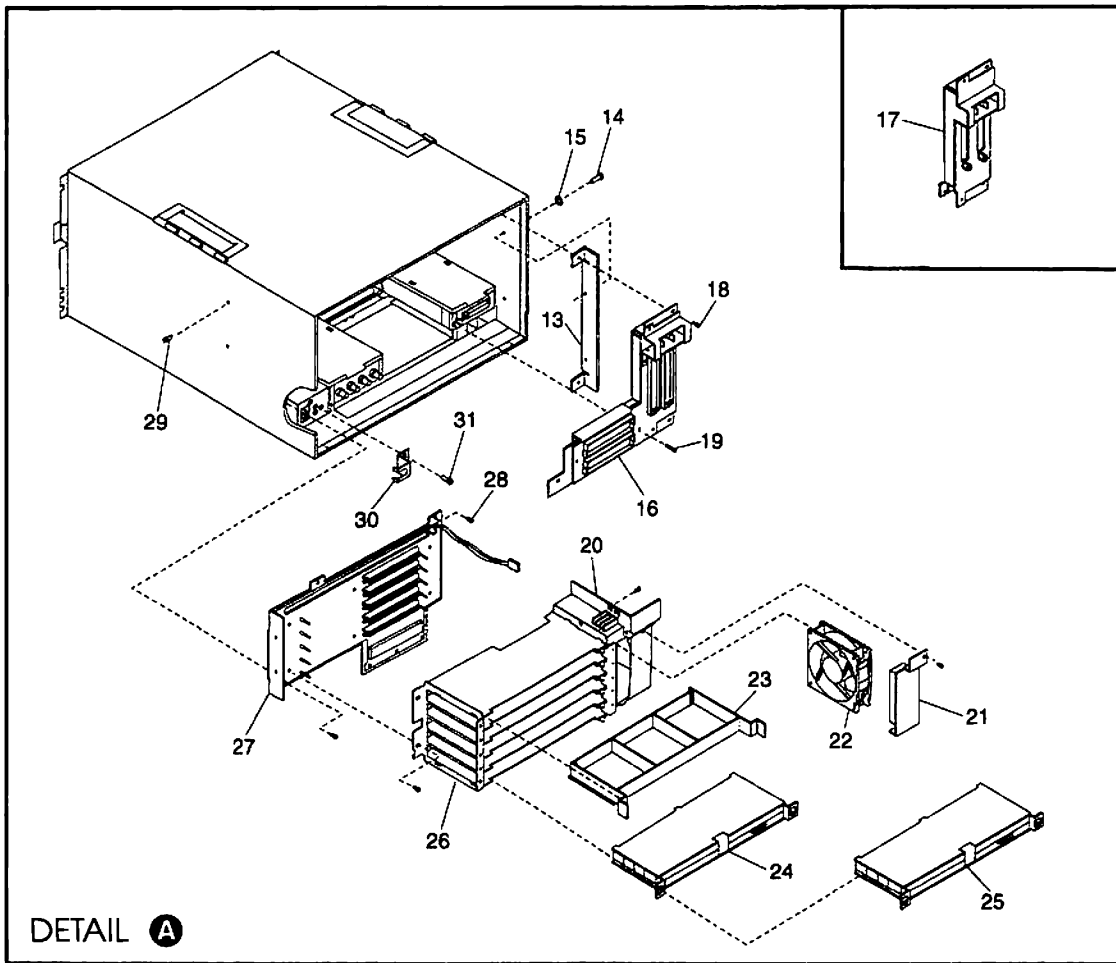
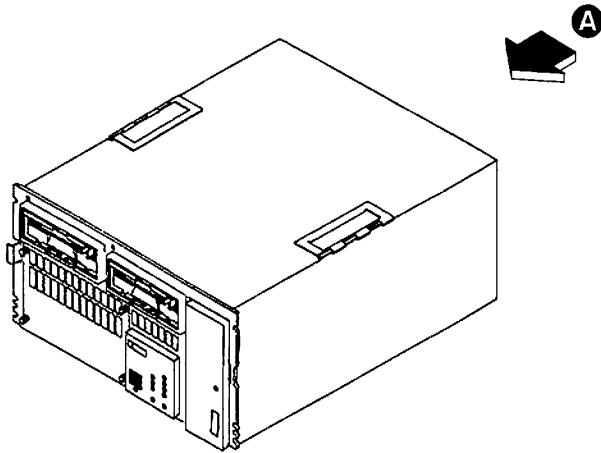
Assembly 1: Final Assembly 3174 Models 21H,21L,21R,22L,23R,24R



C-AM5P001

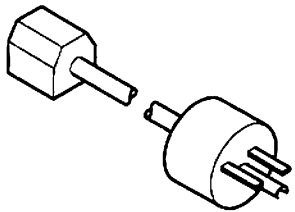
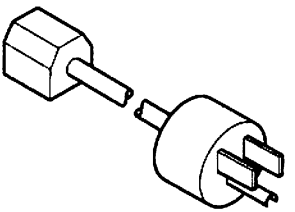
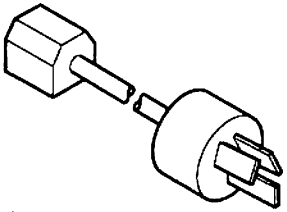
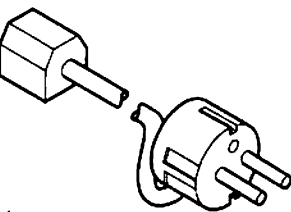
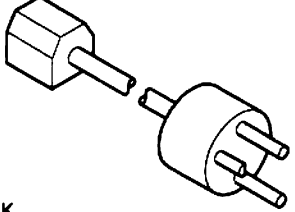
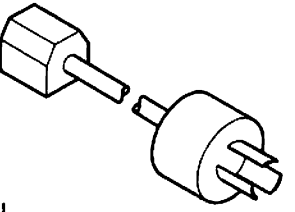
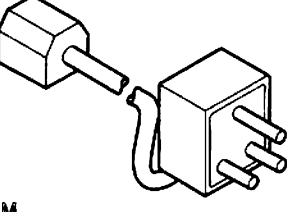
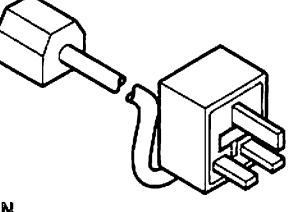
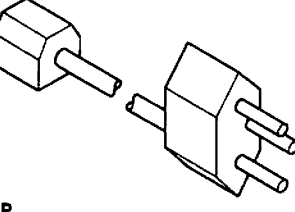
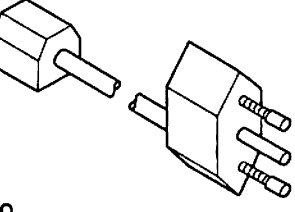
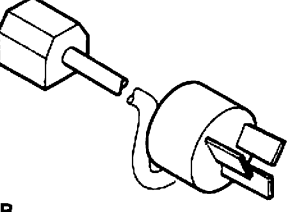
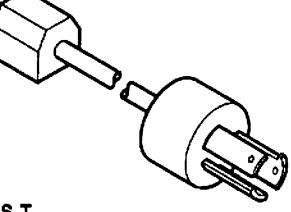
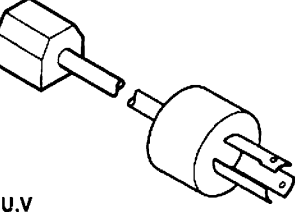
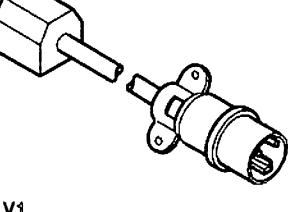
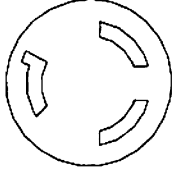
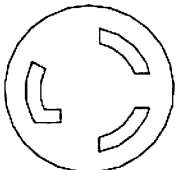
Asm- Index	Part Number	Units	Description
1-		NP	Final Assembly
-1	53F7846	1	• Decorative Panel-Model 21H
-1	53F5707	1	• Decorative Panel-Model 21L
-1	53F5708	1	• Decorative Panel-Model 21R
-1	53F7849	1	• Decorative Panel-Model 22L
-1	53F7856	1	• Decorative Panel-Model 23R
-2	93F1165	1	• Diskette Drive Asm- 2.4M
-2A	39F7871	2	• Thumbscrew
-3	26F0062	1	• Bezel-Blank Second File
-3	74F4347	1	• Hard Drive Asm- 20M (Optional)
-3	93F1165	1	• Diskette Drive Asm- 2.4M (Feature)
-4	39F7871	AR	• Thumbscrew-Not Used With Bezel
-5	74F4348	1	• Operator Panel Asm-Model 21L (Without Overlays)
-5	74F4362	1	• Operator Panel Asm-Model 21R (Without Overlays)
			Note: Order OP Panel Overlay Separate by Country
-5	39F9159	1	• Overlay,OP Panel Model 21L,21H-English
-5	39F9157	1	• Overlay,OP Panel Model 21L,21H-Portuguese
-5	39F9161	1	• Overlay,OP Panel Model 21L,21H-French
-5	39F9163	1	• Overlay,OP Panel Model 21L,21H-German
-5	39F9165	1	• Overlay,OP Panel Model 21L,21H-Italian
-5	39F9167	1	• Overlay,OP Panel Model 21L,21H-Japanese
-5	39F9169	1	• Overlay,OP Panel Model 21L,21H-Spanish
-5	53F5721	1	• Overlay,OP Panel Model 21R,22L,23R-English
-5	53F5719	1	• Overlay,OP Panel Model 21R,22L,23R-Portuguese
-5	53F5723	1	• Overlay,OP Panel Model 21R,22L,23R-French
-5	53F5725	1	• Overlay,OP Panel Model 21R,22L,23R-German
-5	53F5727	1	• Overlay,OP Panel Model 21R,22L,23R-Italian
-5	53F5729	1	• Overlay,OP Panel Model 21R,22L,23R-Japanese
-5	53F5731	1	• Overlay,OP Panel Model 21R,22L,23R-Spanish
-6		AR	• PIM
-7	25F8394	1	• Shield, PIM Label
-7A	39F7879	1	• Access Cover
-7B	39F7871	4	• Thumbscrew
-8		1	• Planar Asm-Model 21L
-8		1	• Planar Asm-Model 21R
-9	1673724	2	• Screw,Hex HD Cap-M4 X 10 Long
-10	74F4356	1	• • Fan Asm
-11	92F4545	1	• Power Supply- 100V(order 11A)
-11	92F4546	1	• Power Supply- 200V(order 11A)
-11	92F4547	1	• Power Supply- 100V(includes index 11A)
-11	92F4548	1	• Power Supply- 200V(includes index 11A)
-11A	74F4382	1	• Power Supply Overlay
-12	1621587	2	• Screw,Cap Hex HD-M4 X 16 Long

Assembly 1: (continued)



Asm- Index	Part Number	Units	Description
1-13	53F5687	1	• Bracket,Mounting, Model 21L
-14	1621191	2	• Screw,Pan Hd-M4 X 10 Lg
-15	1622275	2	• Washer
-16	53F5693	1	• Tailgate-Channel Attached Model 21L Only
-17	39F6880	1	• Internal Channel Tailgate Asm
-18	1673722	3	• Screw,Hex HD Cap-M4 X 6 Long
-19	1621588	1	• Screw,Cap Hex HD-M4 X 20 Long
-20	39F7862	1	• Plenum
-21	53F5705	1	• Bracket,Fan
-22	74F4354	1	• Fan
-23	53F7835	1	• Cassette-Blank
-24		AR	• Feature Card
-25		AR	• Feature Card-ISDN Used on Models 21L,21R and 22L Only
-26	39F7861	1	• Card Cage
-27	74F4352	1	• Frame/Board Asm
-28	1673724	3	• Screw,Hex HD Cap-M4 X 10 Long
-29	1673722	2	• Screw,Hex HD Cap-M4 X 6 Long
-30	33G3626	1	• Clamp,Line Cord For high voltage power supplies
-31	1621191	2	• Screw,Pan Hd-M4 X 10 Lg
-32	53F7812	AR	• Management Hook,Cable (Not Illustrated)
-33	2114044	AR	• Retainer,Cable (Not Illustrated)

Assembly 2: Cable Assemblies With Component Parts

 <p>A,B</p>	 <p>C,D,F</p>	 <p>H</p>	 <p>J</p>
 <p>K</p>	 <p>L</p>	 <p>M</p>	 <p>N</p>
 <p>P</p>	 <p>Q</p>	 <p>R</p>	 <p>S,T</p>
 <p>U,V</p>	 <p>V1</p>		 <p>RECEPTACLE</p>
 <p>RECEPTACLE</p>			

CAM4P004

Asm-Index	Part Number	Units	Description
2-	376038	1	Attachment Cord,Pwr(10A/250V) 9309 Rack to 3174
-A	1838573	1	Attachment Cord,Pwr(10A/250V) 4.3M Unshielded-Liberia,Saudi Arabia, Bahamas,Barbados,Bermuda,Bolivia,Brazil, Caymen Isl.,Costa Rica,Dom Republic, Equador,El Salvador,Guatemala,Haiti, Honduras,Jamaica,Japan,Korea,Netherlands Antilles,Panama,Peru,Philippines,Taiwan, Thailand,Trinidad,USA,Venezuela, For Molded Plug,See Figure A
-B	1838576	1	Attachment Cord,Pwr(10A/250V) 1.8M Unshielded-USA For Molded Plug,See Figure B
-C	1838584	1	Attachment Cord,Pwr(10A/125V) 4.3M Unshielded-USA(Hospital Shield) For Molded Plug,See Figure C
-D	1838587	1	Attachment Cord,Pwr(10A/125V) 1.8M Unshielded-USA(Hospital Shield) For Molded Plug,See Figure D
-F	6952299	1	Attachment Cord,Pwr(10A/125V) 4.3M Unshielded-Aramco,Bahrain,Liberia, Saudi Arabia,Bahamas,Barbados,Bermuda, Bolivia,Brazil,Canada,Caymen Isl., Colombia,Costa Rica,Dom Republic, Equador,El Salvador,Guatemala,Guyana, Haiti,Honduras,Jamaica,Japan,Korea, Mexico,Netherlands Antilles,Nicaragua, Panama,Philippines,Suriname,Taiwan, Trinidad,USA,Venezuela, For Molded Plug,See Figure F
-H	6952310	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Argentina,Australia, Colombia,New Zealand,Papua N. Guinea, Paraguay,Uruguay,Western Samoa, For Molded Plug,See Figure H
-J	6952319	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Angola,Aramco,Austria, Belgium,Bulgaria,Czech Republic,Slovakia, Germany,Egypt,Finland,France,Greece,Hungary, Iceland,Iran,Lebanon,Luxembourg, Mozambique,Netherlands,Norway,Poland, Portugal,Romania,Spain,Sudan,Sweden, Syrian Arab Rep.,Turkey,Countries formerly part of USSR and Yugoslavia,Zaire,Afghanistan, Indonesia For Molded Plug,See Figure J
-K	6952328	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Denmark For Molded Plug,See Figure K

Assembly 2: (continued)

Asm- Index	Part Number	Units	Description
2-L	6952337	1	Attachment Cord,Pwr(10A/125V) 4.3M Unshielded-Japan For Molded Plug,See Figure L
-M	6952346	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Bangladesh,Pakistan, South Africa,Burma,Sri Lanka, For Molded Plug,See Figure M
-N	6952355	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Bahrain,Channel Islands, Cyprus,Ghana,Iraq,Ireland,Jordan,Kenya, Kuwait,Libya,Malawi,Malta,Nigeria,Oman, Qatar,Romania,Somalia,Sierra Leone, Tanzania,Uganda,United Arab Emirat, United Kingdom,Yemen,Zambia,Antigua, Brunei,Hong Kong,India,Malaysia,Nepal, Singapore,For Molded Plug,See Figure N
-P	6952364	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Switzerland For Molded Plug,See Figure P
-Q	6952373	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Italy,Chile,Ethiopia For Molded Plug,See Figure Q
-R	6952382	1	Attachment Cord,Pwr(6A/250V) 4.3M Unshielded-Israel For Molded Plug,See Figure R
-S	7842122	1	Attachment Cord,Pwr(10A/250V) Twist Lock, 1.8M Unshielded-USA For Molded Plug,See Figure S
-T	7842124	1	Attachment Cord,Pwr(10A/250V) Twist Lock, 4.3M Unshielded-Mexico,USA For Molded Plug,See Figure T
-U	7842140	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 1.8M Unshielded-USA For Molded Plug,See Figure U
-V	7842142	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 4.3M Unshielded- USA/Canada/Nicaragua For Molded Plug,See Figure V
-V1	6168689	1	Attachment Cord,Pwr(10A/250V) 4.3M Waterproof Unshielded-USA Only For Molded Plug,See Figure V1
-V1	6168690	1	Attachment Cord,Pwr 1.8M Long 1.8M Waterproof Unshielded-USA Only For Molded Plug,See Figure V1

Asm- Index	Part Number	Units	Description
			Cable Assemblies
2-W	25F8490	1	Cable Asm,V.35 Ext 6.1M
-W	25F8491	1	Cable Asm,V.35 Ext France 6.1M
-W	39F7864	1	Cable Asm,AEA Adapter USA/AFE
-X	39F7865	1	Cable Asm,AEA Adapter Europe
-X	39F7963	1	Cable Asm,V.35 Ext 12.2M
-X	39F7964	1	Cable Asm,V.35 Ext France 12.2M
-X	39F7965	1	Cable Asm,E1A Ext Germany 12.2M
-Y	39F7966	1	Cable Asm,E1A Ext Japan 12.2M
-Y	39F7967	1	Cable Asm,E1A Ext Germany 6.1M
-Y	53F4779	1	Cable Asm,E1A Ext 6.1M
-Y	53F4780	1	Cable Asm,E1A Ext 12.2M
-Y	53F4783	1	Cable Asm,E1A Ext Japan 6.1M
-Z	6165837	1	Cable Asm,Token Ring Ext 2.4M USA/AFE
-Z	39F7982	1	Cable Asm,Token Ring Ext 2.4M EMEA
-Z	6168155	1	Cable Asm,X.21 Ext 6.1M
-Z	6168156	1	Cable Asm,X.21 Ext 12.2M
-AA	74F4402	1	Cable Asm,External ISDN Feature USA,Canada,Japan Models 21L,21R and 22L
-	39F9181	2	• Fuse,Slo-Blo 2A USA,Canada,Japan
-BB	74F4404	1	Cable Asm,External ISDN Feature WT Models 21L,21R and 22L
-	39F9153	2	• Fuse,Slo-Blo 2.5A WT

Part Number Index

Part Number	Asm-Index	Page	Part Number	Asm-Index	Page
376038	2-	6-11	53F5721	1-5	6-7
1621191	1-14	6-9	53F5723	1-5	6-7
	1-31	6-9	53F5725	1-5	6-7
1621587	1-12	6-7	53F5727	1-5	6-7
1621588	1-19	6-9	53F5729	1-5	6-7
1622275	1-15	6-9	53F5731	1-5	6-7
1673722	1-18	6-9	53F7812	1-32	6-9
	1-29	6-9	53F7835	1-23	6-9
1673724	1-9	6-7	53F7846	1-1	6-7
	1-28	6-9	53F7849	1-1	6-7
1838573	2-A	6-11	53F7856	1-1	6-7
1838576	2-B	6-11	6165837	2-Z	6-13
1838584	2-C	6-11	6168155	2-Z	6-13
1838587	2-D	6-11	6168156	2-Z	6-13
2114044	1-33	6-9	6168689	2-V1	6-12
25F8394	1-7	6-7	6168690	2-V1	6-12
25F8490	2-W	6-13	6952299	2-F	6-11
25F8491	2-W	6-13	6952310	2-H	6-11
26F0062	1-3	6-7	6952319	2-J	6-11
33G3626	1-30	6-9	6952328	2-K	6-11
39F6880	1-17	6-9	6952337	2-L	6-12
39F7861	1-26	6-9	6952346	2-M	6-12
39F7862	1-20	6-9	6952355	2-N	6-12
39F7864	2-W	6-13	6952364	2-P	6-12
39F7865	2-X	6-13	6952373	2-Q	6-12
39F7871	1-2A	6-7	6952382	2-R	6-12
	1-4	6-7	74F4347	1-3	6-7
	1-7B	6-7	74F4348	1-5	6-7
39F7879	1-7A	6-7	74F4352	1-27	6-9
39F7963	2-X	6-13	74F4354	1-22	6-9
39F7964	2-X	6-13	74F4356	1-10	6-7
39F7965	2-X	6-13	74F4362	1-5	6-7
39F7966	2-Y	6-13	74F4382	1-11A	6-7
39F7967	2-Y	6-13	74F4402	2-AA	6-13
39F7982	2-Z	6-13	74F4404	2-BB	6-13
39F9153	2-	6-13	7842122	2-S	6-12
39F9157	1-5	6-7	7842124	2-T	6-12
39F9159	1-5	6-7	7842140	2-U	6-12
39F9161	1-5	6-7	7842142	2-V	6-12
39F9163	1-5	6-7	92F4545	1-11	6-7
39F9165	1-5	6-7	92F4546	1-11	6-7
39F9167	1-5	6-7	92F4547	1-11	6-7
39F9169	1-5	6-7	92F4548	1-11	6-7
39F9181	2-	6-13	93F1165	1-2	6-7
53F4779	2-Y	6-13		1-3	6-7
53F4780	2-Y	6-13			
53F4783	2-Y	6-13			
53F5687	1-13	6-9			
53F5693	1-16	6-9			
53F5705	1-21	6-9			
53F5707	1-1	6-7			
53F5708	1-1	6-7			
53F5719	1-5	6-7			

Appendix A. 3299 Terminal Multiplexer Reference Information

3299 Model 1	A-2
| 3299 Model 1X4	A-2
3299 Model 2	A-2
3299 Model 3	A-2
3299 Model 32	A-3
| 3299 Model 32T	A-3
3299 Model Interchangeability	A-4
3299 Cabling	A-4
Dual Purpose Connectors (DPC)	A-4
Maximum 3299 Attachment Cable Lengths	A-4

3299 Reference Information

- | This section contains a brief description of the 3299 Terminal Multiplexers Models 1, 1X4, 2, 3, 32, and 32T. It is not intended to provide any details about 3299s.
- | The 3299 Terminal Multiplexer attaches to the 3174 Terminal Adapter. The Model 32 can also attach to a Fiber Optic Terminal Adapter. The input signals from the Terminal Adapter (or FTA) contain addressing to select one of the possible 3299 output driver/receiver ports. The distance 3299s are located from the controller depends on the cable medium being used and whether baluns or other signal matching devices are required.
- | See *3299 Terminal Multiplexer Product Information and Setup* for detailed information on set up, cabling, and problem determination.

3299 Model 1

The Model 1 supports up to eight terminals. It connects to the 3174 with RG-62A/U coaxial cable or the IBM Cabling System (ICS) Types 1, 2, or 9 media. Terminals and printers can be attached to the Model 1 with coaxial cable, ICS, or specified telephone twisted-pair wire (ICS Type 3). An appropriate balun is required for both the input and output cables on the Model 1 when attaching to ICS Types 1, 2, or 9 media. An IBM/Rolm Coax to Twisted-Pair Adapter (CTPA), or equivalent, is required when using telephone twisted-pair.

3299 Model 1X4

- | The 3299 Model 1X4 supports a maximum of four eight-port multiplexers (3299 Models 1, 2, or 3). It connects to the 3174 with RG-62A/U coaxial cable or ICS Types 1, 2, or 9. Eight-port multiplexers can attach to the Model 1X4 via coaxial cable or ICS.
- | Only the multiplexers listed above can attach to the Model 1X4; direct attachment of terminal or printer devices is not supported. The Model 1X4 is intended to connect to terminal adapter (TA) port 0 only.

3299 Model 2

The 3299 Model 2 supports up to eight terminals. It connects to the 3174 with RG-62A/U coaxial cable or ICS Types 1, 2, or 9 media. Terminals and printers can be attached to the Model 2 with coaxial cable, ICS, or specified telephone twisted-pair wire (ICS Type 3). A 3270 IBM Dual Purpose connector to Twisted-Pair (DPC-T3) Adapter, or equivalent, is required when using telephone twisted-pair.

3299 Model 3

The 3299 Model 3 supports up to eight terminals. It connects to the 3174 with RG-62A/U coaxial cable or ICS Types 1, 2, or 9 media. Terminals and printers can be attached to the Model 3 with specified telephone twisted-pair wire (ICS Type 3) without the need for a DPC-T3 or equivalent adapter.

3299 Model 32

The 3299 Model 32 supports up to 32 terminals. It connects to the 3174 with RG-62A/U coaxial cable, ICS Types 1, 2, or 9 media, or fiber optic cable. When fiber optic cable is used, a Fiber Optic Terminal Adapter (FC 3110) must be installed in the 3174. Terminals and printers can be attached to the Model 32 using coaxial cable, ICS, or specified telephone twisted-pair (ICS Type 3). A DPC-T3 Adapter, or equivalent, is required when using telephone twisted-pair.

3299 Model 32T

- | The 3299 Model 32T supports a maximum of 32 terminals. It connects to the 3174 with RG-62A/U coaxial
- | cable or ICS Types 1, 2, or 9. Terminals and printers can be attached to the Model 32T directly via
- | specified telephone twisted-pair (ICS Type 3) wire without the need for a DPC-T3 Adapter (or equivalent)
- | at the multiplexer end of the wire.

3299 Model Interchangeability

Fault isolation and resolution are customer responsibilities. To improve availability it is recommended to the customer that a minimum number of spare 3299s 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 medium being used to connect the terminals to the 3299, then a 3299 Model 2 can be replaced with a Model 1.

- A 3299 Model 3 can be replaced only with a Model 3.
- A 3299 Model 32 can be replaced only with a Model 32.
- A 3299 Model 32T can be replaced only with a Model 32T.
- A 3299 Model 1X4 can be replaced only with a Model 1X4.

3299 Cabling

Figure A-2 on page A-6 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 (or equivalent).

Dual Purpose Connectors (DPC)

Older 3270 products, such as the 3299 Model 1, use standard coaxial BNC jacks and accept only standard BNC connectors. Newer 3270 products, such as the late model 3299s, the 3174, and many terminals, use DPC jacks that are designed to accept either coaxial BNC connectors or DPC connectors. These DPC connectors have driver/receiver circuitry that allows direct attachment to either coax or ICS Type 1, 2, and 9 without the use of a balun. DPC connectors look very similar to coaxial BNC connectors, but can be recognized by an additional conductor located in the connector center and insulator tube that extends approximately 5 mm (3/16 of an inch) beyond the body of the connector (see Figure A-1). This insulator prevents a DPC connector from being connected to a BNC jack. A BNC connector, however (typically used on the ends of coaxial cable) can be connected to a DPC jack.

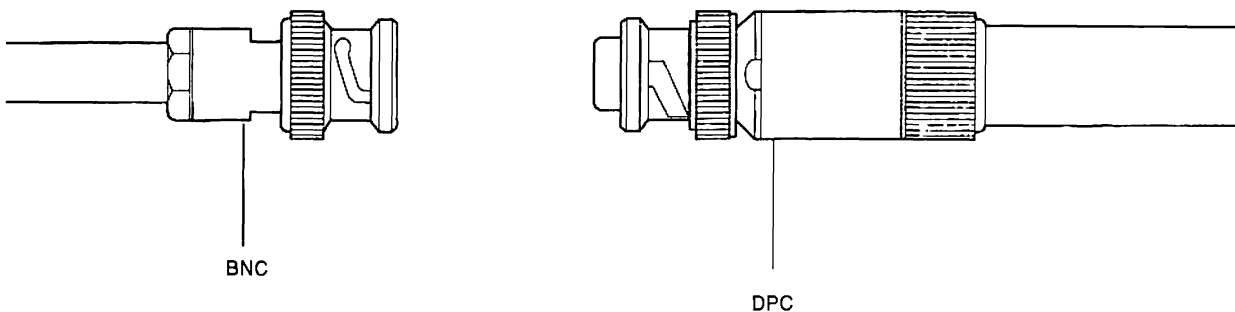


Figure A-1. BNC and DPC Connectors

Maximum 3299 Attachment Cable Lengths

The following table outlines the maximum cabling distances between the 3174 and the 3299, and between the 3299 and a terminal.

Table A-1. 3299 Maximum Wire Lengths

Number of Baluns	RG-62A/U Coaxial Cable	ICS (Types 1 & 2)	ICS (Type 9)	Telephone Twisted Pair (Type 3) ¹
0 ²	1370 m (4500 ft)	1150 m (3780 ft)	768 m (2520 ft)	275 m (900 ft)
0 ³	1500 m (4920 ft)	1500 m (4920 ft)	1000 m (3280 ft)	275 m (900 ft)
1	N/A	1000 m (3280 ft)	667 m (2186 ft)	275 m (900 ft)
2	N/A	610 m (2000 ft)	406 m (1333 ft)	275 m (900 ft)

¹Minimum 30.5 m (100 ft) is required, except for terminal attachment to Models 3 and 32T. Telephone twisted-pair is not recommended between the 3174 and the 3299.

²These wire lengths apply to connection between the 3299 Model 1X4 and 8-port multiplexers.

³These wire lengths apply to connection between the 3299 and the controller and between the 3299 and a terminal.

Notes:

1. Balun or signal matching device (for example, the IBM 3270 DPC-T3 Adapter) is recommended when attaching device with DPC connectors to telephone twisted-pair wire.
2. Configuration planning information for determining the maximum drive distances for fiber optic cables is in *IBM 3299 Terminal Multiplexer Model 32 Planning for Optical Fiber Cable*, GA27-3902.
3. Based on the default coax (media) Timeout Period (50 microseconds), the maximum recommended distance from the 3174 to a device is 3000 m (9840 ft).

3299 Reference Information

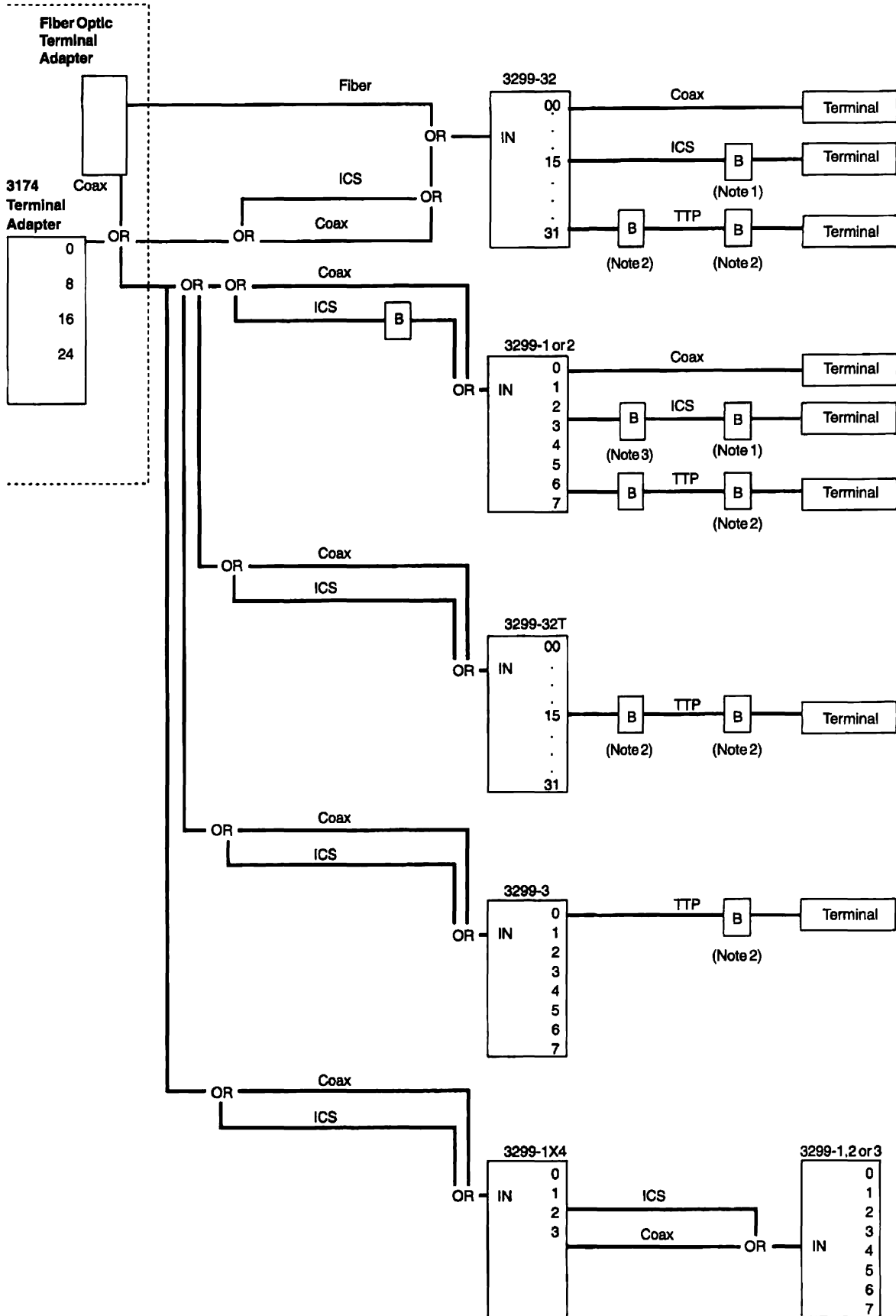


Figure A-2. 3299 Cabling

Legend:

B = Balun

ICS = Twisted Pair, ICS Type 1, 2, or 9 media

TTP = Telephone Twisted Pair, ICS Type 3

Notes:

1. Terminals with the DPC do not require the use of baluns when used with the ICS Type 1, 2, or 9.
2. Terminals with the DPC can use a balun of a DPC-T3 Adapter.
3. Model 1 only.

Appendix B. X.25 Feature

X.25 Feature	B-2
Timers	B-3
X.25 Network	B-3
Virtual Circuits	B-3
Logical Channels	B-3
Packet Types	B-4
X.25 Key Functions	B-6
Indicators	B-7
X.25 States	B-8
Call Ready (SVC only)	B-8
Data Ready	B-9
Disconnect in Progress	B-9
Incoming Call	B-10
Local Mode	B-10
Exception Case Handling	B-10
X.25 SVC States and Key Operation	B-11
Dial Mode Screen	B-14
Switched Virtual Circuit (SVC)	B-16
Autocall and Autodisconnect	B-16
Permanent Virtual Circuit (PVC)	B-16
PVC Keys	B-16
LOCAL Key	B-16
COMM Key	B-16
Summary of States and Indicators	B-17
Permanent Virtual Circuit	B-17
Switched Virtual Circuit	B-18

X.25 Feature

The Type 1 and Type 2 Communication Adapters and Type 1 and Type 2 Concurrent Communication Adapters 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 3174 SNA attachments. They are not detailed here. These SNA protocols are described in the *3174 Functional Description*.

The International Telegraph and Telephone Consultative Committee (CCITT) recommendation is that X.25 define an interface between 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. The 3174 provides the physical level interface using the following:

- X.21 leased
- X.21 bis (V.24 or V.35)
- EIA 232D (CCITT)
- Transmission is (NRZ) non-return to zero with clocking externally supplied
- Up to 64Kbps.

Link Level: The link access procedure for interchange of data across communication links between DTEs and DCEs. The 3174 provides the link level interface using the following:

- Link Access Procedure Balanced (LAPB)
- Modulo 8 Link Level Sequence Numbering.

Packet Level: The packet formats and logical protocols for the exchange of control information and user data between DTEs and DCEs. The 3174 provides the packet level interface using the following:

- Up to 8 virtual circuits—any combination of switched virtual circuits (SVC) and permanent virtual circuits (PVC)
- 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
- Qualified Logical Link Control (QLLC).

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 seconds with 1 retry	400	532 21
Transmit failure (write timeout)	36	501 04
Open timeout	25.6	506 02
Tp(T1)/Np(N2)	Customer-specified values (configuration responses 450 and 451)	

X.25 Network

This section describes X.25 virtual circuits and logical channels.

Virtual Circuits

A permanent virtual circuit (PVC) may be thought of as a point-to-point SDLC leased line. A switched virtual circuit (SVC) may be thought of as a point-to-point switched line.

Logical Channels

Each virtual circuit is assigned a logical channel group number (0–15) and a logical channel number (1–255) by the Packet Switched Data Network (PSDN). These two numbers make up the logical channel identifier (LCID). This LCID may be entered while 3174 is being configured.

The following logical channel types may exist:

- Permanent channel:** Used for a PVC dedicated to data transfer between a 3174 and a specific host DTE.
- Outgoing channel:** Used for an SVC where only the 3174 can initiate a call.
- Incoming channel:** Used for an SVC where only a remote DTE can initiate a call.
- Two-Way channel:** Used for an SVC where either the 3174 or the remote DTE can initiate a call.

Packet Types

The following X.25 packet types are supported by the 3174. The cause and diagnostic codes mentioned in the descriptions are described in *3174 Status Codes*

Call Request (SVC): The Call Request packet is transmitted by the 3174 when an X.25 dial operation is performed by the operator or when an Autocall is configured and the first LT is powered on. This packet contains the called number and optional information which matches the user's subscription. The optional information is based on operator input or the options selected while configuring.

Incoming Call (SVC): The Incoming Call packet is received by the 3174 as a result of a remote DTE transmitting a Call Request Packet. The 3174 examines the data in the packet (based on options selected during configuration) to ensure that it conforms to the information configured or as specified by the display operator through a dial operation.

Call Accepted (SVC): The Call Accepted packet is sent by the 3174 after an Incoming Call packet has been accepted.

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 (when the DISC key is pressed) or the network (normal circuit termination), when Autodisc is configured and the last LT powers off, or as a result of certain errors detected by the 3174. Cause and diagnostic codes are included. If caused by a 3174-detected error, the codes are logged and displayed.

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 cause and diagnostic codes are logged and displayed.

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 SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence. Reset Request is also sent when you press the LOCAL key for a PVC.

Reset Indication (PVC/SVC): The Reset Indication packet is received by the 3174 as a result of problems detected by the network or the remote DTE. The circuit is stopped, and the error condition is logged with cause and diagnostic codes. The SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence.

Reset Confirmation (PVC/SVC): The Reset Confirmation packet is transmitted by the 3174 to acknowledge receipt of a Reset Indication packet, or the Reset Confirmation packet may be received by the 3174 in confirmation of a Reset Request packet.

Restart Request (PVC/SVC): The Restart Request packet is sent when the 3174 is resetting the link due to detecting certain X.25 errors. 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
- The link has been closed because of an error condition. In this event, the 3174 immediately attempts to re-open the link. Cause and diagnostic codes are included and logged.

When the link is reset because of error conditions, the cause and diagnostic codes are logged.

Restart Indication (PVC/SVC): When the Restart Indication packet is received, the 3174 responds with a Restart Confirmation packet, and shuts down the link. The cause and diagnostic codes are logged.

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 to acknowledge receipt of a Restart Indication packet.

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 data 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.

X.25 Feature

X.25 Key Functions

The following keys are available to operators of attached 3178, 3277, 3279, or similar display stations. They are not supported on distributed function terminals, such as the 3290 Information Panel. The operator must toggle to an LT assigned to a particular host to perform a function for that host.

- LOCAL key
- DIAL key
- DISC (disconnect) key
- COMM (communication) key.

The devices attached to port 0 of hardware groups 26 and 27 normally have access to the full complement of X.25 Switched function keys. The keys may optionally be assigned to all ports, or certain keys may be deleted, depending on how the 3174 was configured. To execute any of the X.25 function keys, 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.

For information about Extension mode, refer to *3174 Terminal User's Reference for Expanded Functions*, GA23-0332 and *3270 X.25 Operation*, GA23-0204.

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. See Figure B-2 on page B-11 for details.

Indicators

Table B-2 shows typical X.25 indicators.

Table B-2. X.25 Operator Information Area Status Indicators

OIA Symbol	Meaning
N	Network In Use
↯	Call Ready
↯ xccdd	Call Ready (with cause and diagnostic codes)
↯ * ?	Dial-In (dialing terminal)
↯ **	Dial-In (other terminals)
→↯	Outgoing Call In Process
←↯	Incoming Call In Process
↯ ⌚	Disconnect In Process
↯ 599	Local Mode
↯ xccdd	X.25 Communication Reminder (with cause and diagnostic codes)
✕ ↯	Operator Communication Check

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.

Cause and Diagnostic (C&D) indicators are displayed in the operator information area to aid in user problem determination for abnormal disconnection. They are displayed with the Call Ready indicator when cause and/or diagnostic codes are received by or transmitted from the 3174 because of an error condition. They are not displayed when the 3174 operator causes a normal disconnect through the DISC key function. Cause and diagnostic codes are also displayed with the X.25 Communication Reminder indicator and indicate the cause and diagnostic codes from a Restart/Reset/Clear packet transmitted or received from the 3174.

X.25 Feature

X.25 States

- Call Ready — Circuit is in the disconnected state. It is possible to attempt a connection.
- Local— Circuit is 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.

Call Ready (SVC only)

- After power is on and the link is operational, the Call Ready indicator is displayed.
- The DIAL key, LOCAL key, or an Incoming Call is accepted when the Call Ready indicator is displayed.

When the DIAL key is pressed in call-ready state, the Dial indicator replaces the Call Ready indicator. The DIAL key initiates keyboard reset and clear functions simultaneously. The reset function restores the keyboard, repositions the cursor to home, returns to the base character set, and restores all input-inhibit conditions except:

- Wait
- Device busy
- Device very busy
- Device not functional
- Security key.

If the keyboard is not reset, the DIAL key performs no function, and extension mode is exited.

The dial screen is displayed. (See “Dial Mode Screen” on page B-14 for a definition of the dial screen.) The appropriate information is entered by the operator.

After the information is keyed in, press the ENTER key. If the data is successfully validated by the 3174, the data entered by the operator is stored, a Call Request packet is assembled and transmitted by the 3174, and the Outgoing Call in Progress indicator replaces the dial indicator.

If the ENTER key has not been pressed, or if the entered data was not valid, the information stored by the last successful DIAL/ENTER key operation may be retrieved by pressing the DIAL key again. When dial mode has been entered by a display station, an attempted entry of dial mode at any other display station is inhibited and the Operator Communication Check indicator is displayed.

When in dial mode, the DISC key on other terminals operates normally.

Dial mode operations are shown in Figure B-1 on page B-9.

Pressing the CLEAR key while in dial mode causes the input fields on the screen to be restored from the previously stored values. Once there is no connection with a host application, no AID-generating operation is attempted.

When the online test 0 (/0) is directed to a terminal in dial mode, the dial mode is reset, the call-ready mode is set, the terminal enters test mode, and the test is executed.

Action Taken	Symbol	Dialing Terminal	Symbol	Other Terminals
DIAL key	$\overline{Z} \# ?$	Accepted. Display Dial screen with saved parameters	$\times \overline{Z}$ and $\overline{Z} \# \#$	Rejected.
LOCAL key	$\times \overline{Z}$	Rejected.	$\times \overline{Z}$ and $\overline{Z} \# \#$	Rejected.
COMM key	$\times \overline{Z}$	Rejected.	$\overline{Z} \# \#$	Ignored.
DISC key	\overline{Z}	Accepted. (See Note.)	\overline{Z}	Accepted. (See Note)
TEST key	TEST	Accepted. Abort Dial-In.	TEST	Accepted.
ENTER key	\overline{Z} (if ok) $\times \overline{Z} \# ?$ (if not ok)	Validate input. If OK, accept ENTER key, update parameters, initiate outgoing call. (See Note.)	$\times - f$ and $\overline{Z} \# \#$	Rejected.
CLEAR key	$\overline{Z} \# ?$	Accepted. Display Dial screen with saved parameters.	$\overline{Z} \# \#$	Accepted. Clear screen.
PA,PF, ATTN, SYS REQ keys	$\times - f$	Rejected.	$\times - f$ and $\overline{Z} \# \#$	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.

Disconnect in Progress

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.

X.25 Feature

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. 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.

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 are rejected for this host and outgoing calls are not allowed.

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.

Exception 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. X.25 Communication Reminder indicator while in X.25 SVC mode:

The X.25 Communication Reminder state is transient and is succeeded by the Call Ready with XCCDD state (SVC). 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. If the error persists, the problem determination manual procedures identified by the particular status code should be followed. See the *3174 Status Codes* manual.

3. Machine Check.

This means an error was detected in the 3174 subsystem. The same action as for the base 3174 should be followed.

No unique machine-check numbers are generated.

X.25 SVC States and Key Operation

This section defines how a key is treated 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.)

Status	Operation		
	DIAL Key Pressed	ENTER Key Pressed	DISC Key Pressed
Call Ready	Accepted. ¹ — * ? or — * *	Accepted. Dial in complete. →	Ignored. —
Call Ready with C&D Codes	Accepted. ¹ — * ? or — * *	Accepted. Dial in complete. →	Accepted. ² —
Outgoing Call in Process	Rejected. X — →	Rejected. X - f →	Accepted. —
Incoming Call in Process	Rejected. X — ←	Rejected. X - f ←	Accepted. —
Data Ready	Rejected. X —	Rejected. Treated as AID key. —	Accepted. —
Disconnect in Process	Rejected. X — —	Rejected. X - f	Ignored. —
Local	Rejected. X — → 599	Rejected. X - f → 599	Ignored. → 599
X.25 Communication Reminder	Rejected. X — → XCCDD	Rejected. X - f → XCCDD	Ignored. → 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

X.25 Feature

Status	Operation		
	LOCAL Key Pressed	AID Key Pressed	COMM Key Pressed
Call Ready	Accepted.	Rejected. X-f	Ignored. Z
Call Ready with C&D Codes	Accepted.	Rejected. X-f	Accepted. ⁴ Z
Outgoing Call in Process	Rejected. X-f Z →	Rejected. X-f	Ignored. Z
Incoming Call in Process	Rejected. X-f Z ←	Rejected. X-f	Ignored. Z
Data Ready	Rejected. X-f Z	Same as base machine. X-f	Rejected. X-f Z
Disconnect in Process	Rejected. X-f Z Z	Rejected. X-f	Rejected. X-f Z
Local	Ignored. Z 599	Rejected. X-f Z 599	Accepted. Z (SVC) or 505-01 (PVC)
X.25 Communication Reminder	Rejected. X-f Z	Rejected. X-f Z XCCDD	Rejected. X-f Z Z 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. X?+	Abort Print ID. X?+	Abort Print ID. X-f	Abort Print ID. Accepted.	Not Aborted Data Key = Numeric: Printer Status □-□ ■ Alpha: Printer Status □-□ ALPHA	Not Aborted Accepted.	Abort Print ID. X?+
Dead-key operation in process	Abort Dead key. ▶	Abort Dead key. TEST	See Note X?+	See Note X?+	Accepted.	Accepted.	a,e,i,o,u Accepted. Not a,e,i,o,u X?+ See Note	Accepted.	See Note X?+
X.25 Communication Reminder	Accepted. ▶	Enter Test mode. TEST	X-f	X-f	X-f	X-f	Accepted.	X?+	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. X?+	Exit Extension mode. X?+	Exit Extension mode. X?+
Dial	Accepted. ▶	Abort Dial In. ⁵ TEST	Rejected. ⁵ X-f -Z #? or -Z ##	Accepted. ⁵ -Z #? or -Z ##
Test	X-f TEST	Exit Test mode.	X-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

X.25 Feature

Dial Mode Screen

Figure B-3 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
TCLS         - 9
OOPT         - 00000000
IOPT         - 00000000
COPT         - 00000000
I/O          - 0
```

Figure B-3. Dial Mode Screen

Entries are validated. If a number or value is invalid, Input Inhibited and Wrong number indicators are displayed and the cursor is positioned in the first character location of the invalid field.

The input fields shown in Figure B-3 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 contains only the HNAD field. Display HNAD field only is the default for the configuration option. **CID**

- This 8-character field contains the CID (connection identifier or network password).
- 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).

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).

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) selected during the configuration procedure.
- If the circuit type (question 401) specified during configuration is outgoing call only, this field is not displayed.

COPT

- This field allows the operator to override the connection options (question 453) selected during the configuration procedure.

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.

X.25 Feature

Switched Virtual Circuit (SVC)

When using the SVC support on the 3174, the host connection operates as if it were a switched line. A virtual circuit is established when a call is made. You can terminate or clear the call, whenever you want, using the X.25 keys. You can also have the 3174 automatically make the call and clear it. See "Autocall and Autodisconnect."

The X.25 keys are available on CUT-mode display stations. They are not available on DFT devices.

Autocall and Autodisconnect

The Autocall and Autodisconnect functions eliminate the need for a user to manually initiate host connections with the DIAL key. It also makes it unnecessary for an operator to use the DISC key to break a host connection.

Each host can be customized for Autocall and/or Autodisconnect as follows:

Autocall

When a non-printer LT associated with a host is powered on and there is not host connection yet, the controller automatically initiates an outgoing call to the host.

Autodisconnect

When the last non-printer LT associated with a host is powered off, the 3174 automatically performs the DISC function to the host.

These functions reduce the need for an operator console in X.25 installations. For information on how to customize for Autocall and Autodisconnect, refer to the chapter on planning for X.25 in the *3174 Planning Guide*.

Permanent Virtual Circuit (PVC)

PVC Keys

Only two of the keys defined earlier in this appendix are provided for PVC connections. They are the LOCAL and COMM keys. Optionally, the function of these keys may be deleted from the 3174 through configuration.

LOCAL Key

The LOCAL key allows a display operator to disconnect a PVC from the network. When the LOCAL key is pressed, the 3174 determines whether any SNA sessions are active for that host. The PVC may have been configured so that, if there are no sessions active, the 3174 immediately initiates a close-circuit sequence. If there are SNA sessions active, the Operator Communication Check and Input Inhibited indicators are displayed. If the LOCAL key is pressed a second time without the RESET key being depressed, the close-circuit sequence is initiated. If the RESET key is pressed to restore the keyboard, two consecutive LOCAL key sequences are required. A configuration option is provided that allows the first pressing of the LOCAL key to always perform the close-circuit sequence. The initiation of a close-circuit sequence displays the Local indicator.

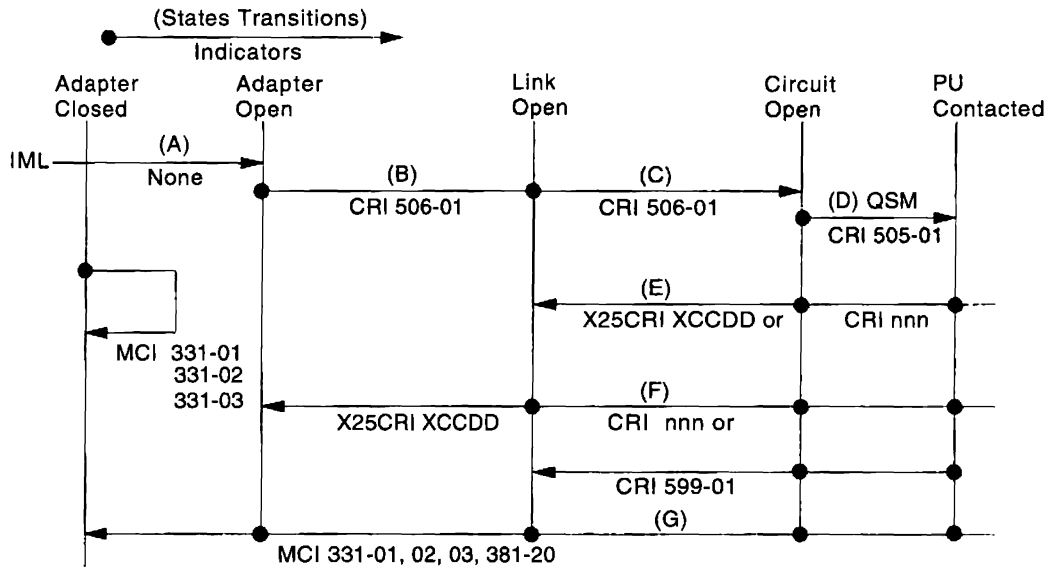
COMM Key

Pressing the COMM key when in local mode causes a PVC to be reconnected to the network.

Summary of States and Indicators

Permanent Virtual Circuit

Figure B-4 provides a summary of PVC states and indicators.



CRI = Communication Reminder indicator (nnn) MCI = Machine Check indicator
X25CRI = X.25 Communication Reminder indicator QSM = QLLC Set Mode

Figure B-4. PVC States and Indicators

X.25 Feature

Switched Virtual Circuit

Figure B-5 provides a summary of SVC states and indicators.

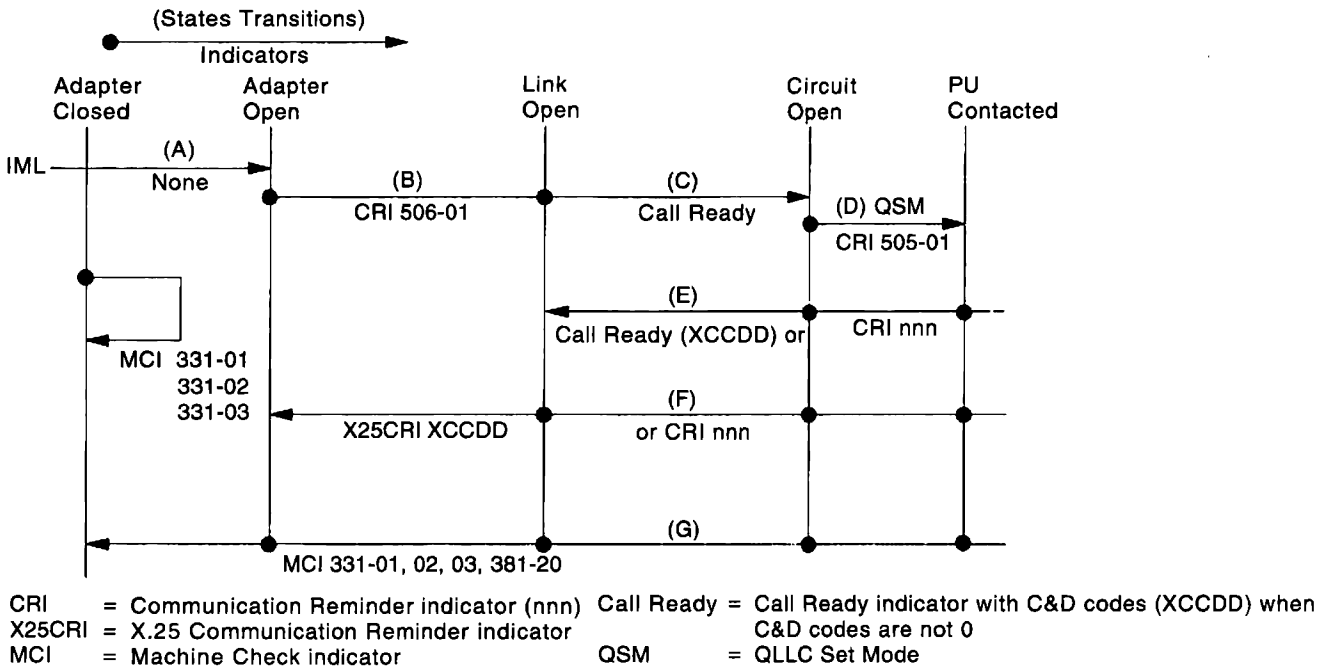


Figure B-5. SVC States and Indicators

Appendix C. X.21 Feature

Introduction	C-2
X.21 Functional Description	C-2
X.21 Switched Microcode Function	C-4
Function Requests	C-4
Call Collision	C-5
Call Progress (CP) Signals	C-5
Data Link Control Function	C-5
Call Ready	C-5
Incoming Call in Progress	C-6
Dialing	C-6
Direct Call	C-6
Outgoing Call in Progress	C-6
Local Mode	C-6
Disconnection	C-7
Status and Key Operation	C-7

X.21 Feature

Introduction

The Type 2 Concurrent Communication Adapter in the 3174 Establishment Controller enables the 3174 to be attached to a DCE that operates as specified in CCITT Recommendation X.21 at speeds of 2400, 4800, 9600, 48 000, and 64 000bps.

To use the X.21 Switched feature with keyboard connection control, the 3174 must have a CUT-mode display station attached. The 3174 may be configured to automatically make and break the connection, which eliminates the need for a CUT-mode terminal. The terminal user can access the X.21 function keys through Extension mode. Refer to *3174 Terminal User's Reference for Expanded Functions* for information on the key sequences to enter in Extension mode and how to select an X.21 function.

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 Concurrent 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.

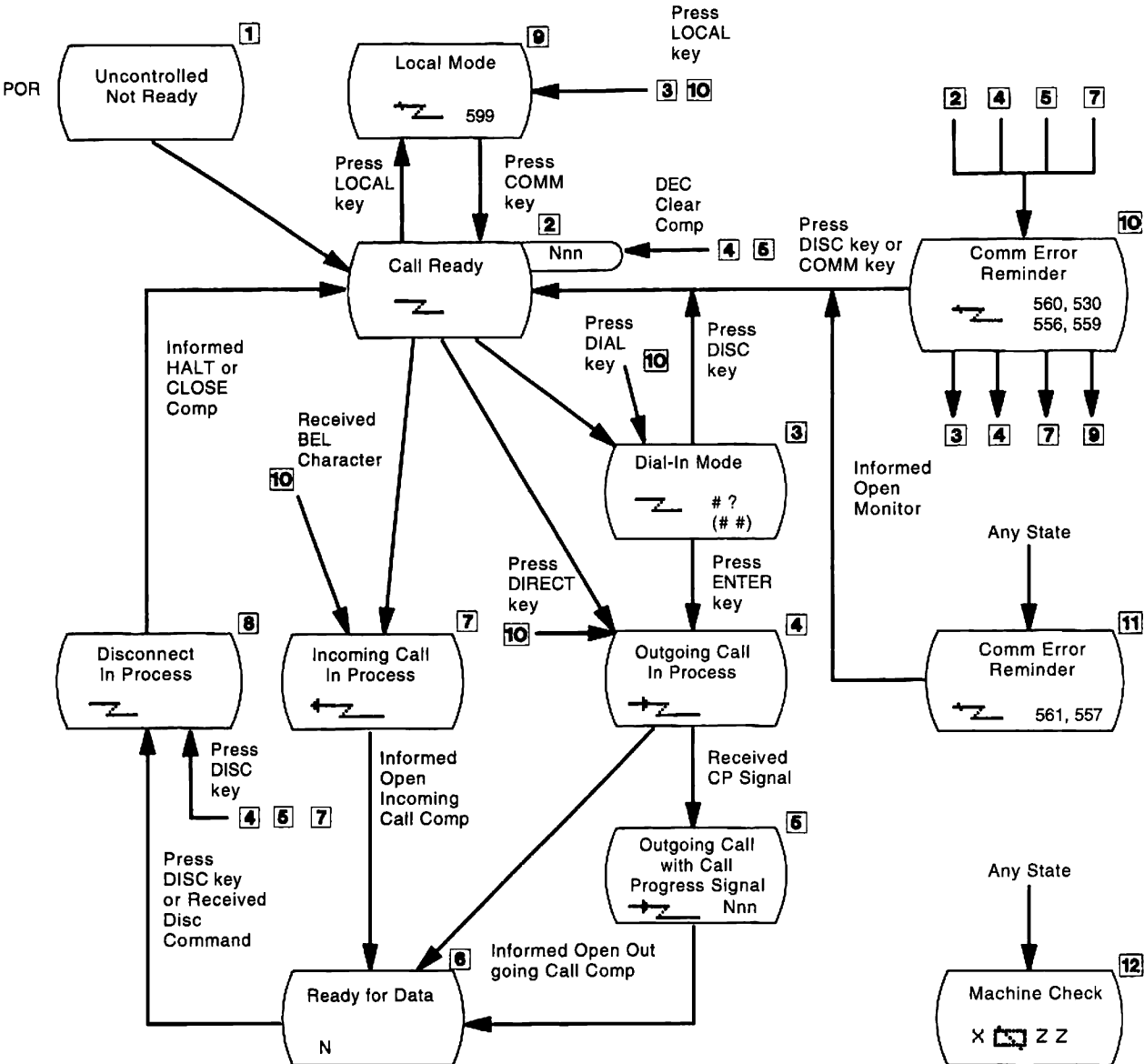


Figure C-1. Data Link Control Function

X.21 Feature

X.21 Switched Microcode Function

Function Requests:

1. OPEN for outgoing call.

By this request, the HPCA and the X.21 hardware are reset and enabled. After passing through the ready state, they proceed with the outgoing call establishment.

The microcode signals the X.21 hardware to enter the call-request state and awaits the reception of an IA5 plus (+) character from the network.

When the request contains selection signals, the microcode/X.21 hardware sends two IA5 sync characters and the selection signals (including 'dial digits') that were set up by the data link control in the selection signal buffer.

The X.21 hardware monitors the network interface; if 'call progress' signals and/or called line identification are received, they are passed on to the microcode. After translation, the microcode passes 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 enters the data-transfer phase after housekeeping and preparing the X.21 hardware and microcode to receive the first SDLC frame. The data link control is notified that the Open is completed.

The process is similar when outgoing call is direct. A direct call by the data link control identifies a direct call by specifying no dial digits. When the IA5 plus (+) character is received, signifying select from the network, the microcode enters the DTE waiting state for the reception of 'call progress' signals, called line identification (the indication that the network is ready for data).

2. OPEN for incoming call.

When the data link control issues the X.21 Open function request for an incoming call, the action of the microcode/X.21 hardware differs slightly from that for an outgoing call.

- The microcode/X.21 hardware determines that the network is ready, then enters the ready state to wait for an interrupt from the X.21 hardware signifying activity on the network.
- Receipt of one IA5 BEL character identifies the incoming call state. The microcode posts an intermediate completion status/IA5 (BEL RCVD), and when it regains control, prompts the X.21 hardware to turn on the control lead that signifies the call-accepted state.
- The microcode now waits for an interrupt to indicate either that the calling line identification has been received or that the network is ready for data. If line identification is received, the microcode moves it to the data link control's buffer, and the completion status is passed on in the same way as for an outgoing call.

When the ready-for-data condition is detected, the data-transfer phase is entered after the microcode completes appropriate housekeeping and prepares the X.21 hardware for the first SDLC frame. A normal completion to the Open function request is posted by the microcode.

3. Open for monitoring

The microcode checks the X.21 interface periodically. If the DCE's status coincides with the condition specified by the data link control, that is, DCE ready or DCE not ready, the microcode reports normal completion.

4. Close

If the clearing sequence is already completed, the microcode merely executes the final housekeeping requirements; otherwise, the microcode starts a clearing sequence. When the clearing sequence ends properly, and no comparator error is indicated by the X.21 hardware, a normal completion is posted. When the clearing sequence does not end properly within its time limit, or if a comparator error exists, appropriate error status is posted. The HPCA and the X.21 hardware are always reset prior to posting any completion code to the Close FR. The microcode/X.21 hardware is 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 resolves 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 are moved to the data link control's buffer.

When reacting to an IA5 '0' CP, the microcode posts 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.

X.21 Feature

6. After the line is disconnected by an error, or after the X.21 open request is completed erroneously, except if condition 7 exists. (The Call Ready indicator is overridden by the communication error reminder. This reminder can be reset by the COMM key, and the Call Ready indicator appears.)
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. For Configuration Support B Release 3 or higher, the digits of the address last used are displayed here. You may type over them or use them if they are the digits you want. 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. If Autocall is customized, an automatic call may be placed when a different logical terminal (LT) becomes active. This takes precedence over the dialing terminal and changes the X.21 state to Outgoing Call in Progress.

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. You can also enter this state if Autocall is customized and the first LT becomes active.

Local Mode: When the LOCAL key is pressed in the call-ready state, the data link control issues the HALT request and displays the Local Mode indicator.

The local mode is the X.21 controlled-not-ready state and inhibits incoming and outgoing calls.

When the COMM key is pressed in local mode, the data link control issues an Open for Incoming request to the microcode and displays the Call Ready indicator.

Disconnection: When the DISC key is pressed in the ready-for-data state or outgoing/incoming call-in-progress state, the data link control issues a CLOSE request in the ready-for-data state, or issues a HALT request in the outgoing/incoming call in progress state to the microcode, and displays the Disconnect in Progress indicator. When the close completion code is returned from the microcode, the data link control turns off the In Use indicator, issues an Open for Incoming request to the microcode, enters the call ready state, and displays the Call Ready indicator. When the halt-completion code is returned, the data link control issues an Open for Incoming request to the microcode, enters the call-ready state, and displays the Call-Ready indicator.

The line is also disconnected automatically by a timeout condition, or the SDLC DISC command, or when the last LT becomes inactive and Autodisconnect is customized.

Status and Key Operation

Figure C-2 and Figure C-3 on page C-8 show how keys are treated when pressed in the X.21 Switched states and when in the dial-in mode.

Status	Operation					
	DIAL Key Pressed	DIRECT Key Pressed	DISC Key Pressed	LOCAL Key Pressed	COMM Key Pressed	AID Key Pressed
Call Ready	Accept	Accept →Z	Ignore	Accept	Ignore	
Call Ready with Call Progress Signal	Accept	Accept* →Z	Accept*	Accept	Accept*	
Outgoing Call In Process	X 1 →Z →Z	→Z	Accept	X 1 →Z →Z	Ignore →Z	→Z
Outgoing Call In Process with Call Progress Signal	X 1 →Z →Z	→Z	Accept	X 1 →Z →Z	Ignore →Z	→Z
Incoming Call In Process	X 1 →Z ←Z	←Z	Accept	X 1 →Z ←Z	Ignore ←Z	←Z
Data Ready	X 1 →Z	X 1 →Z	Accept	X 1 →Z	Ignore	Same as the base machine
Disconnect In Process	X 1 →Z →Z	X 1 →Z	Ignore	X 1 →Z	Ignore	
Local	X 1 →Z	X 1 →Z	X 1 →Z	Ignore	Accept	

* Reset Call Progress Signals

Note: In each box under "Operation," the upper row shows an indicator from column 8 and the lower row shows an indicator from column 20.

Figure C-2. Key Operation (During X.21 Switched States)

X.21 Feature

Key Pressed	Reaction	
	Dial-Originating Terminal	Other Terminal
DIAL	Clear Screen → * ?	X f → → * *
DIRECT	→	X f → → * *
LOCAL	→ 599	X f → → * *
COMM	Ignore → * ?	Ignore → * *
DISC	→	→
AID	X-f → * ?	X-f → * *
CLEAR	Clear Screen → * ?	Clear Screen → * *
TEST	Test Abort Dial	Test → * *
ENTER	→	X-f → * *

* 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

Glossary of Terms and Abbreviations

This glossary defines terms and abbreviations used in this manual. It includes terms and definitions from the *IBM Dictionary of Computing* (New York; McGraw-Hill, Inc., 1994).

- The symbol (A) identifies definitions from the *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018.
- The symbol (E) identifies definitions from the *ANSI/EIA Standard - 440A: Fiber Optic Terminology*, copyright 1989 by the Electronics Industries Association (EIA). Copies can be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue N.W., Washington, DC 20006.
- The symbol (I) identifies definitions from the *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1).
- The symbol (T) identifies definitions from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1.

The following cross-references are used in this glossary:

Contrast with. This refers to a term that has an opposed or substantively different meaning.

See. This refers the reader to multiple-word terms in which this term appears.

See also. This refers the reader to terms that have a related, but not synonymous, meaning.

Synonym for. This indicates that the term has the same meaning as a preferred term, which is defined in the glossary.

A

abort. To terminate, in a controlled manner, a processing activity in a computer system because it is impossible or undesirable for the activity to proceed. (T)

access procedure. The procedure or protocol used to gain access to a shared resource. In a LAN, a shared resource is the medium. Some medium access procedures specified by the IEEE 802 standards are carrier sense multiple access with collision detection (CSMA/CD), token bus, and token ring.

access unit. A unit that allows multiple attaching devices access to a token-ring network at a central point such as a wiring closet or in an open work area.

ACK. Acknowledge.

acknowledgment. The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender.

active. (1) Able to communicate on the network. A token-ring network adapter is active if it is able to transmit and receive on the network. (2) Operational. (3) Pertaining to a node or device that is connected or is available for connection to another node or device. (4) Currently transmitting or receiving.

active monitor. A function in a single adapter on a token-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.

ACTLU. Activate Logical Unit.

ACTPU. Activate Physical Unit.

adapter. (1) A general term for a device that provides some transitional function between two or more devices. (2) In a local area network, within a communicating device, a circuit card with its associated software that enables the device to communicate over the network.

adapter address. Twelve hexadecimal digits that identify a LAN adapter.

address. (1) In data communication, the IEEE-unique code or the unique locally administered code assigned to each device or workstation connected to a network. (2) A character, group of characters, or 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. (T) (3) To refer to a device or an item of data by its address. (A) (4) The location in the storage of a computer where data is stored. (5) In word processing, the location, identified by the address code, of a specific section of the recording medium or storage. (T)

address space. A set of addresses used to uniquely identify network accessible units, sessions, adjacent link

stations, and links in a node for each network in which the node participates. A type 2.1 node has one address space for intranode routing and one for each transmission group on which it can send message units.

advanced peer-to-peer networking (APPN). An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection and reconfiguration, adaptive route selection, and simplified network definition; and (c) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control; APPN also uses LU 6.2 protocols on its own control point sessions that provide the network control.

advanced peer-to-peer networking (APPN) end node. A type 2.1 end node that provides full SNA end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node, to dynamically register its resources with the adjacent CP (its network node server), to send and receive directory search requests, and to obtain management services; it can also attach to a subarea network as a peripheral node.

Advanced peer-to-peer networking (APPN) network. A type 2.1 network having at least one APPN node.

Advanced peer-to-peer networking (APPN) network node. A type 2.1 node that besides offering full SNA end-user services, provides intermediate routing services within a T2.1 network, and network services to its local LUs and attached T2.1 end nodes in its domain; it can also attach to a subarea network as a peripheral node.

AEA. Asynchronous Emulation Adapter.

AEA port. A communication connector on the Asynchronous Emulation Adapter (AEA).

AID. Attention identifier.

alert. (1) For IBM LAN management products, a notification indicating a possible security violation, a persistent error condition, or an interruption or potential interruption in the flow of data around the network. See also *network management vector transport*. (2) In SNA, a record sent to a system problem management focal point to communicate the existence of an alert condition. (3) In the NetView program, 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.

Alt. Alternate.

alternate 1 initial microcode load (Alt 1 IML). The initiating procedure for running specific adapter tests, starting customizing, or doing a normal IML.

alternate 2 initial microcode load (Alt 2 IML). The initiating procedure for running a general 3174 controller test.

American National Standard Code for Information Interchange (ASCII). The 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 graphics characters. (A)

A/N. Alphanumeric.

analog. Pertaining to data consisting of continuously variable physical quantities. (A) Contrast with *digital*.

APL. A Programming Language.

application. (1) The use to which an information processing system is put, for example, a payroll application, an airline reservation application, or a network application. (2) A collection of software components used to perform specific types of work on a computer.

application program. (1) A program written for or by a user that applies to the user's work. Some application programs receive support and services from a special kind of application program called a network application program. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

APPN. Advanced peer-to-peer networking.

APPN network node. See *advanced peer-to-peer networking network node*

ARB. adapter request block

architecture. A logical structure that encompasses operating principles including services, functions, and protocols. See *computer architecture*, *network architecture*, *Systems Application Architecture (SAA)*, *Systems Network Architecture (SNA)*.

ASCII. American National Standard Code for Information Interchange.

ASCII emulation. The ability of a 3270 display station or printer to communicate with an ASCII host using the DEC VT100, DEC VT220, Data General D210, or IBM 3101 data stream.

asynchronous. (1) Pertaining to two or more processes that do not depend upon the occurrence of a specific event such as a common timing signal. (T)
(2) In Fiber Distributed Data Interface (FDDI) rings, a type of data traffic that does not need bounded access delay to the medium and guaranteed throughput.

Asynchronous Emulation Adapter (AEA). In the 3174, 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 data streams, such as the DEC VT100, DEC VT220, Data General D210, or IBM 3101 data streams.

attach. To make a device part of a network logically.

attaching device. Any device that is physically connected to a network and can communicate over the network.

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.

ATTN. Attention.

attribute. (1) A characteristic. (2) A terminal display language or transformation definition language (TDL) keyword that specifies a particular quality for the TDL object with which it is associated.

attribute select keyboard. A keyboard that enables the operator, when permitted by the program, to change the character attributes of the keyed-in character.

audible alarm. (1) An alarm that is sounded when designated events occur that require operator attention or intervention before system operation can continue. (2) A special feature that sounds a short, audible tone automatically when a character is entered from the keyboard into the next-to-last character position on the screen. The tone can also be sounded under program control.

autobaud. In the 3174 AEA feature, the process of determining the line speed and parity settings of a connecting display station from a specific sequence of characters (CR . CR) entered from the keyboard. ASCII hosts may also support automatic speed and parity detection, but the character sequence they require may differ.

automatic answering (auto-answer). (1) Answering in which the called data terminal equipment (DTE) automatically responds to the calling signal.

Note: The call may be established whether or not the called DTE is attended. (2) A machine feature that permits a station to respond without operator action to a call it receives over a switched line. See also *manual answering*. Contrast with *automatic calling*.

automatic calling (auto-call). (1) Calling in which the elements of the selection signal are entered into the data network contiguously at the full data signaling rate. (2) A machine feature that permits a station to initiate a connection with another station over a switched line without operator action. (3) See also *manual calling*. Contrast with *automatic answering*.

automatic single-route broadcast. A function used by some IBM bridge programs to determine the correct settings for, and set the bridge single-route broadcast configuration parameters dynamically, without operator intervention. As bridges enter and leave the network, the parameter settings may need to change to maintain a single path between any two LAN segments for single-route broadcast messages. See also *single-route broadcast*.

B

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.

baseband. (1) A frequency band that uses the complete bandwidth of a transmission medium. Contrast with *broadband* and *carrierband*. (2) A method of data transmission that encodes, modulates, and impresses information on the transmission medium without shifting or altering the frequency of the information signal.

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.

basic information unit (BIU). The unit of data and control information that is passed between half-sessions. It consists of a request/response header followed by a request/response unit.

baud. The rate at which signal conditions are transmitted per second. Contrast with *bits per second (bps)*.

BDY. Boundary.

beacon. (1) A frame sent by an adapter on a ring network indicating a serious ring problem, such as a broken cable. It contains the addresses of the beaconing station and its nearest active upstream neighbor (NAUN). (2) To send beacon frames continuously. An adapter is *beaconing* if it is sending such a frame.

beaconing. An error-indicating function of token-ring adapters that assists in locating a problem causing a hard error on a token-ring network.

BECN. Backward explicit congestion notification.

BER. Bit error rate.

binary synchronous communication (BSC). A form of telecommunication line control that uses a standard set of transmission control characters and control character sequences, for binary synchronous transmission of binary-coded data between stations. Contrast with *synchronous data link control (SDLC)*.

bind pacing. A technique by which the address space manager (ASM) at one node controls the rate of transmission of Bind requests of a sending ASM at another node. Bind pacing can be used to prevent Bind standoff, in which each of two nodes has reserved most of its resources for sessions it is attempting to initiate through the other and thus rejects any Binds received from the other.

BIS. Bracket initiation stopped.

bit. Either of the binary digits: a 0 or 1.

bit error rate (BER). In fiber optics, a comparison of the number of bits received incorrectly to the total number of bits transmitted. The BER is directly related to receiver sensitivity, transmitter power output, and total link attenuation.

bits per second (bps). The rate at which bits are transmitted per second. Contrast with *baud*.

BIU. Basic information unit.

bootstrap. (1) A sequence of instructions whose execution causes additional instructions to be loaded and executed until the complete computer program is in storage. (T) (2) A technique or device designed to bring itself into a desired state by means of its own action, for example, a machine routine whose first few instructions are sufficient to bring the rest of itself into the computer from an input device. (A)

bps. Bits per second.

bracket. One or more chains of request units and their responses that are exchanged between two session

partners and that 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 workstations.

bridge. (1) An attaching device that connects two LAN segments to allow the transfer of information from one LAN segment to the other. A bridge may connect the LAN segments directly by network adapters and software in a single device, or may connect network adapters in two separate devices through software and use of a telecommunications link between the two adapters. (2) A functional unit that connects two LANs that use the same logical link control (LLC) procedures but may use the same or different medium access control (MAC) procedures. (T) Contrast with *gateway* and *router*.

bridge number. The bridge identifier that the user specifies in the bridge program configuration file. The bridge number distinguishes among parallel bridges. Parallel bridges connect the same two LAN segments.

broadband. A frequency band divisible into several narrower bands so that different kinds of transmissions such as voice, video, and data transmission can occur at the same time. Synonymous with *wideband*. See also *baseband*.

broadcast. Simultaneous transmission of data to more than one destination.

broadcast frame. A frame that is simultaneously transmitted to more than one destination. A broadcast frame is forwarded by all bridges, unless otherwise restricted.

BSC. Binary synchronous communication.

buffer. (1) A portion of storage used to hold input or output data temporarily. (2) A routine or storage used to compensate for a difference in data rate or time of occurrence of events, when transferring data from one device to another. (A)

buffer address. The address of a location in the buffer.

burst. In data communication, a sequence of signals counted as one unit in accordance with some specific criterion or measure.

bus. (1) In a processor, a physical facility on which data is transferred to all destinations, but from which only addressed destinations may read in accordance with appropriate conventions. (1) (2) A network configuration in which nodes are interconnected through a bidirectional transmission medium. (3) One or more conductors used for transmitting signals or power. (A)

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.

byte. (1) A string that consists of a number of bits, treated as a unit, and representing a character. (T) (2) A binary character operated upon as a unit and usually shorter than a computer word. (A) (3) A string that consists of a particular number of bits, usually 8, that is treated as a unit, and that represents a character. (4) A group of 8 adjacent binary digits that represent one extended binary-coded decimal interchange code (EBCDIC) character. (5) See *n-bit byte*.

C

C&D. Cause and diagnostic (codes)

cable loss (optical). The loss in an optical cable equals the attenuation coefficient for the cabled fiber times the cable length.

cable segment. A section of cable between components or devices on a network. A segment may consist of a single patch cable, multiple patch cables connected together, or a combination of building cable and patch cables connected together. See *LAN segment*, *ring segment*.

cache. An optional part of the directory data base, in network nodes where frequently used directory information may be stored to speed directory searches.

call establishment. The complete sequence of events necessary to establish a data connection.

card. In the 3174, 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.

carrier. A wave or pulse train that may be varied by a signal bearing information to be transmitted over a communication system.

carrierband. A frequency band in which the modulated signal is superimposed on a carrier signal (as differentiated from baseband), but only one channel is present on the medium (as differentiated from broadband). Contrast with *baseband* and *broadband*.

carrier sense. In a local area network, an ongoing activity of a data station to detect whether another station is transmitting. (T)

cathode ray tube (CRT). A vacuum tube in which a beam of electrons can be moved to draw lines or to form characters or symbols on its luminescent screen.

CAW. Channel address word.

CCA. Concurrent Communication Adapter.

CCITT. International Telegraph and Telephone Consultative Committee.

CECP. Country extended code page.

Central site change management (CSCM). A function of the 3174 Establishment Controller 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 control facility (CSCF). A function of the NetView program that allows a network operator to execute the test facilities of the 3174 Establishment Controller remotely from the NetView console.

central site customizing. The process of tailoring the 3174 Licensed Internal Code 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.

chain. (1) A group of logically linked user data records processed by LU 6.2. (2) A group of request units delimited by begin-chain and end-chain. Responses are always single-unit chains.

change-screen key. In MLT, a key or sequence of keys on a display station keyboard used to change sessions, one at a time, with up to five different hosts.

channel. (1) A functional unit, controlled by a host computer, that handles the transfer of data between processor storage and local peripheral equipment. (2) A path along which signals can be sent. (3) The portion of a storage medium that is accessible to a given reading or writing station. (4) In broadband transmission, a designation of a frequency band 6 MHz wide.

channel-attached. Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. Synonym for *local-attached*. Contrast with *link-attached*.

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.

CIR. Committed Information Rate.

CID. Connection identifier.

circuit. (1) A logic device. (2) One or more conductors through which an electric current can flow.

circuit switching. A process that, on demand, connects two or more data terminal equipment (DTE) devices and permits the exclusive use of a data circuit between them until the connection is released. (I) (A) Synonymous with *line switching*.

Class of service (COS). A designation of the transport network characteristics, such as route security, transmission priority, and bandwidth, needed for a particular session. The class of service is derived from a *mode name* specified in the Bind by the initiator of a session.

class-of-service (COS) database. A database maintained independently by each network node, and optionally by APPN end nodes. It contains one entry per class-of-service name; each database entry contains:

- A definition of the acceptable values for transmission group (TG) and node characteristics for routes described by that class-of-service name and the weight function to be used to compute the weights of nodes and TGs that meet the acceptable values
- The transmission priority to be used for traffic that flows on routes described by that class-of-service name.

Clear to Send (CTS) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the CTS lead on an EIA 232D interface.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

cluster controller. A device that can control the input/output operations of more than one device connected to it. A cluster controller may be controlled by a program stored and executed in the unit, for example, the IBM 3174 Establishment Controller. Or, it may be entirely controlled by hardware, for example, the IBM 3272 Control Unit. See also *cluster* and *cluster controller node*. Synonymous with *cluster control unit*.

cluster controller node. A peripheral node that can control a variety of devices. See also *host node*, *Network Control Program (NCP) node*, and *terminal node*.

cluster control unit. Synonym for *cluster controller*.

coax. Coaxial (cable).

coaxial (coax) cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of a larger diameter, usually copper tubing or copper braid.

code violation. In differential Manchester encoding, a bit that does not have a state transition at the mid-bit point. See *differential Manchester encoding*.

collision. (1) An unwanted condition that results from concurrent transmissions on a channel. (T) (2) When a frame from a transmitting adapter encounters any other signal in its path (frame, noise, or another type of signal), the adapter stops transmitting and a collision is registered.

COMM. Communication.

command. (1) A request for performance of an operation or execution of a program. (2) A character string from a source external to a system that represents a request for system action.

command retry. A channel and control unit procedure that causes a command to be retried without requiring an I/O interruption.

communication adapter. (1) A circuit card with associated software that enables a processor, controller, or other device to be connected to a network. (2) See *EIA communication adapter, V.35 communication adapter*, and *X.21 communication adapter*.

communication controller. (1) A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program processed in a processor to which the controller is connected or by a program executed within the device. (2) A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network. (3) See also *cluster controller*, *communication controller node*, and *transmission control unit*.

communication controller node. A subarea node that does not contain a system services control point (SSCP).

communication link. Physical (hardware) link.

completion code. The final return code provided by a program or adapter, as a result of an issued command, to indicate that an operation has ended.

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) See *terminal component* and *solid state component*.

computer architecture. The organizational structure of a computer system, including hardware and software. (A)

Concurrent Communication Adapter (CCA). In the 3174, a communication adapter that, along with the necessary microcode, provides terminals attached to the 3174 with the ability to concurrently access an additional 3270 host.

configuration. (1) 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 may refer to a hardware configuration or a software configuration. (l) (A) (2) The devices and programs that make up a system, subsystem, or network. (3) See also *system configuration*.

connect. In a LAN, to physically join a cable from a station to an access unit or network connection point. Contrast with *attach*.

Connection Menu. A menu on the screen of a display station attached to the 3174, from which a user can select an available host.

connector. A means of establishing electrical flow.

cont. Continuous.

contention. (1) In a LAN, a situation in which two or more data stations are allowed by the protocol to start transmitting concurrently and thus risk collision. (T) (2) In a session, a situation in which both NAUs attempt to initiate the same action at the same time, such as when both attempt to send data in a half-duplex protocol (half-duplex contention). At session initiation, one NAU is defined to be the contention winner; its action will take precedence when contention occurs. The contention loser must get explicit or implicit permission from the contention winner to begin its action.

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 block. (1) A storage area used by a computer program to hold control information. (l) (2) 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 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 point (CP). (1) A component of a node that manages resources of that node and optionally provides services to other nodes in the network. Examples are a system services control point (SSCP) in a type 5 node, a physical unit control point (PUCP) in a type 4 node, a network node control point (NNCP) in a type 2.1 (T2.1) network node, and an end node control point (ENCP) in a T 2.1 end node. An SSCP and an NNCP can provide services to other nodes. (2) A component of a T 2.1 node that manages the resources of that node. If the T2.1 node is an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. If the T2.1 node is a network node, the CP also provides services to adjacent end nodes in the T2.1 network.

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.

conversation. A logical connection between two transaction programs using an LU 6.2 session. Conversations are delimited by brackets to gain exclusive use of a session.

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.

converter. In an IBM Token-Ring Network, a device that converts electronic signals to light pulses or vice versa for use in an optical fiber subsystem.

COS. Class of service.

country extended code page (CECP). A function of the 3174 microcode that provides 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.

CP-CP sessions. The parallel sessions between two control points, using LU 6.2 protocols and a mode name of CPSVCMG, on which network services requests and replies are exchanged. Each CP of a given pair has one contention-winner session and one contention-loser session with the other.

CP-SVR. Control point-to-server pipe

CP-to-server (CP-SVR) pipe. The two LU 6.2 sessions between a DLUS node and a DLUR node used to carry SSCP-PU and SSCP-LU session flows.

CRC. Cyclic redundancy check.

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.

CRT. Cathode ray tube.

CSCF. Central Site Control Facility.

CSCM. Central Site Change Management.

CSCU. Central Site Customizing Utility.

CSU. Customer setup.

CTL. Control.

ctr. Counter.

CTS. Clear to Send.

CUG. Closed user group.

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.

customer replaceable unit (CRU). An assembly or part that a customer can replace in its entirety when any of its components fail. Contrast with *field replaceable unit (FRU)*.

customization. Procedures that tailor the controller microcode to fit the various types of display stations and

printers and the method of host attachment that a particular controller will handle.

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.)

CUT. Control unit terminal.

cyclic redundancy check. A system of error checking performed at both the sending station and the receiving station after a block check character sequence has been accumulated.

cyclic redundancy check (CRC). Synonym for *frame check sequence (FCS)*.

D

DAA. Data access arrangement.

DACTPU. Deactivate physical unit.

data. (1) A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human or automatic means. (I) (A) (2) Any representations such as characters or analog quantities to which meaning is or might be assigned. (A)

data access arrangement (DAA). Circuitry that allows privately owned data terminal equipment (DTE) and telecommunication equipment to be connected to the public switched telephone network.

data base. A set of data, part or the whole of another set of data, that consists of at least one file, and that is sufficient for a given purpose or for a given data processing system. (I) (A)

data circuit. (1) A pair of associated transmit and receive channels that provide a means of two-way data communication. (I) (2) In SNA, see also *link connection*.

Notes:

1. Between data-switching exchanges, the data circuit may include data circuit-terminating equipment (DCE), depending on the type of interface used at the data-switching exchange.
2. Between a data station and a data-switching exchange or data concentrator, the data circuit includes the data-terminating equipment at the data station end. It may also include equipment similar to a DCE at the data-switching exchange or data-concentrator location.

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. (I)

Data Entry keyboard. A keyboard layout designed for data entry applications.

data frame. See *frame*.

data link. (1) Any physical link, such as a wire or a telephone circuit, that connects one or more remote terminals to a communication control unit, or connects one communication control unit with another. (2) The assembly of parts of two data terminal equipment (DTE) devices that are controlled by a link protocol, and the interconnecting data circuit, that enable data to be transferred from a data source to a data sink. (I) (3) In SNA, see also *link*.

Note: A telecommunication line is only the physical medium of transmission. A data link includes the physical medium of transmission, the protocol, and associated devices and programs; it is both physical and logical.

data link connection identifier (DLCI). A numeric identifier that is used in a frame-relay network to identify the next segment of a permanent virtual circuit over which a frame is to be relayed.

data link control (DLC). The process responsible for performing communication over a link using a specific data link control protocol, such as SDLC or token ring.

data link control (DLC) layer. (1) In SNA or Open Systems Interconnection (OSI), the layer that schedules data transfer over a link between two nodes and performs error control for the link. Examples of DLC are synchronous data link control (SDLC) for serial-by-bit connection and DLC for the System/370 channel. (2) See *Systems Network Architecture (SNA)*. (3) See also *logical link control (LLC) sublayer* and *medium access control (MAC) sublayer*.

Note: The DLC layer is usually independent of the physical transport mechanism and ensures the integrity of data that reach the higher layers.

data link control (DLC) protocol. The LAN protocol used to attach a device to and remove a device from the network. The DLC protocol is also used to send information onto and receive information from the network, exchange data, and control information with network higher level protocols and interfaces.

data network. An arrangement of data circuits and switching facilities for establishing connections between data terminal equipment. (I)

data object. In the 3174, a data object is either 3174 microcode or 3174 customization data. In NetView DM, data objects are called resources.

data packet. (1) At the interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE), a data unit used to transmit user data over a virtual circuit. (2) In an Open Systems Interconnection (OSI) network, a data unit passed between transport layer entities.

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 streaming. A protocol for transmitting data on a channel. In this protocol, the sender maintains the channel in a transmit state for an extended length of time.

data terminal equipment (DTE). (1) That part of a data station that serves as a data source, data receiver, or both. (I) (A) (2) Equipment that sends or receives data, 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. (1) The result of the transmission of data signals from any data source to a data receiver. (2) The movement, or copying, of data from one location and the storage of the data at another location.

data transfer mode. The method of data transfer between a host computer and a channel-attached device. Data Channel Interlock (DCI) and data streaming are two data transfer modes.

data transfer phase. The phase of a data call during which data signals can be transferred between data terminal equipment (DTEs) connected by the network.

data transfer rate. The average number of bits, characters, or blocks per unit of time passing between equipment in a data-transmission session. (I) The rate is expressed in bits, characters, or blocks per second, minute, or hour.

dBa. Adjusted decibels.

dBm. Decibels based on one milliwatt.

DCC. Disconnect command chaining.

DCE. Data circuit-terminating equipment.

deactivation. The process of taking any element out of service, rendering it inoperative, or placing it in a state in which it cannot perform the functions for which it was designed.

dec. Decimal.

decibel (dB). (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels; if the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

decibels based on 1 milliwatt (dBm). A unit of absolute power measurement that is scaled such that 0 dBm equals 1 milliwatt.

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

default. Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

default value. A value assumed when no value has been specified.

delimiter. (1) A character used to indicate the beginning or end of a character string. (T) (2) A bit pattern that defines the beginning or end of a frame or token on a LAN.

dependent logical unit requester (DLUR). An optional component in an APPN end node or network node that supports dependent secondary LUs local to its node or in adjacent type 2.0 or 2.1 nodes by obtaining SSCP services for the LUs over an APPN network from the appropriate dependent LU server (DLUS). The support is obtained using SSCP-PU and SSCP-LU sessions whose flows are encapsulated on LU 6.2 session flows between the DLUR node and the DLUS node. See also *CP-to-server (CP-SVR) pipe*.

dependent logical unit requester (DLUR) node. An APPN end node or network node that includes the DLUR component.

dependent logical unit server (DLUS). An optional component in an APPN network node that provides SSCP services over an APPN network to remote secondary dependent LUs by using SSCP-PU and SSCP-LU sessions whose flows are encapsulated on LU 6.2 session flows between the DLUS node and the appropriate dependent LU requester (DLUR) nodes. See also *CP-to-server (CP-SVR) pipe*.

dependent logical unit server (DLUS) node. An APPN network node that includes the DLUS component.

DES. Data Encryption Standard.

destination. Any point or location, such as a node, station, or particular terminal, to which information is to be sent.

destination address. A field in the medium access control (MAC) frame that identifies the physical location to which information is to be sent. Contrast with *source address*.

dev. Device.

device. (1) A mechanical, electrical, or electronic contrivance with a specific purpose. (2) An input/output unit such as a terminal, display, or printer. See also *attaching device*.

device address. (1) The first subchannel address recognized by a channel-attached device. (2) In data communication, the identification of any device to which data can be sent or from which data can be received.

DFT. (1) Distributed function terminal. (2) Diagnostic function test.

diagnostics. Modules or tests used by computer users and service personnel to diagnose hardware problems.

differential Manchester encoding. A transmission encoding scheme in which each bit is encoded as a two-segment signal with a signal transition (polarity change) at either the bit time or half-bit time. Transition at a bit time represents a 0. No transition at a bit time indicates a 1.

Note: This coding scheme allows simpler receive/transmit and timing recovery circuitry and a smaller delay per station than achieved with block codes. It also allows the two wires of a twisted pair to be interchanged without causing data errors.

digital. (1) Pertaining to data in the form of digits. (A) Contrast with *analog*. (2) Pertaining to data consisting of numerical values or discrete units.

directory. A database in an APPN node that lists names of resources (in particular, logical units) and records the CP name of the node where each resource is located.

disabled. (1) Pertaining to a state of a processing unit that prevents the occurrence of certain types of interruptions. (2) Pertaining to the state in which a transmission control unit or audio response unit cannot accept incoming calls on a line.

DISC. Disconnect.

disconnect (DISC) character. In data communication, the part of the binary synchronous communication (BSC) transmission control sequence for ending the connection on a switched line.

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.

Disk Operating System (DOS). An operating system for computer systems that use disks and diskettes for auxiliary storage of programs and data.

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.

distribution panel. A wiring board that provides a patch panel function and mounts in a rack. See also *patch panel*.

DLC. (1) Data link control. (2) Data length check.

DLCI. Data link connection identifier.

DLU. Destination logical unit.

DLUR. Dependent logical unit requester.

DLUS. Dependent logical unit server.

DOS. Disk Operating System.

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. (1) On an IBM Token-Ring Network, the direction of data flow. (2) In the direction of data flow or toward the destination of transmission. 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 disk containing the terminal's control program is loaded into the control unit.

downstream physical unit (DSPU). A controller or a workstation downstream from a gateway that is attached to a host.

DPC. Dual-purpose connector.

Dsk. (1) Disk. (2) Diskette.

DSL. (1) Downstream load. (2) Data set label.

DSPU. Downstream physical unit.

DSR. Data set ready.

DTE. Data terminal equipment.

DTR. Data terminal ready.

dump. (1) To write at a particular instant the contents of storage, or part of storage, onto another data medium for the purpose of safeguarding or debugging the data. (T) (2) Data that has been dumped. (I) (A)

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

duplex connector. In an Enterprise Systems Connection environment, the component that terminates both jumper cables in one housing and provides physical keying for attachment to a duplex receptacle.

E

ECC. Error-checking and correction.

ECMA. European Computer Manufacturers' Association.

EIA. Electronic Industries Association.

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.

element. (1) In a set, an object, entity, or concept having the properties that define a set. (l) (A) (2) A parameter value in a list of parameter values.

emulate. To imitate one system with another, primarily by hardware, so that the imitating system accepts the same data, executes the same computer programs, and achieves the same results as the imitated computer system.

emulation. (1) The imitation of all or part of one computer 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. (l) (A) (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*.

enabled. (1) On a LAN, pertaining to an adapter or device that is active, operational, and able to receive frames from the network. (2) Pertaining to a state of a processing unit that allows the occurrence of certain types of interruptions. (3) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

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*.

end node. A T2.1 node that supports sessions between its own control point (CP) and the CP in an adjacent network node, to dynamically register its resources with the adjacent CP, to send and receive

directory search requests, and to obtain network services and management services.

enterprise. A business or organization that consists of two or more sites separated by a public right-of-way or a geographical distance. Contrast with *establishment*.

Enterprise Systems Connection Adapter (ESCON Adapter). In the 3174, this adapter allows the controller to communicate with an IBM S/390* host through an Enterprise Systems Connection Channel using optical fiber cable.

equipment rack. A metal stand for mounting network components, such as distribution panels and IBM 8228 Multistation Access Units. Synonymous with *rack*.

ERP. Error recovery procedures.

ESC. Escape.

ESCD. Enterprise Systems Connection Director.

ESCON. Enterprise Systems Connection.

establishment. A user's premises that do not extend across public rights of way (for example, a single office building, warehouse, or campus). Contrast with *enterprise*.

Ethernet network. A 10-megabit baseband LAN that uses either the Ethernet Version 2 or IEEE 802.3 protocol in which messages are broadcast on a coaxial cable using a carrier sense multiple access/collision detection (CSMA/CD) transmission method.

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.

exception. An abnormal condition such as an I/O error encountered in processing a data set or a file. See also *overflow exception* and *underflow exception*.

Exchange Identification (XID). A specific type of basic link unit that is used to convey node and link characteristics between adjacent nodes. XIDs are exchanged between link stations before and during link activation to establish and negotiate link and node characteristics, and after link activation to communicate changes in these characteristics.

execute. To perform the actions specified by a program or a portion of a program. (T)

execution. The process of carrying out an instruction or instructions of a computer program by a computer. (l) (A)

exit. To execute an instruction or statement within a portion of a program in order to terminate the execution of that portion. (T)

Note: Such portions of programs include loops, routines, subroutines, and modules.

F

fault. An accidental condition that causes a functional unit to fail to perform its required function. (I) (A)

FCC. Federal Communications Commission.

FCS. Frame check sequence.

feature. A part of an IBM product that may be ordered separately by the customer.

FECN. Forward explicit congestion notification

Federal Communications Commission (FCC). A board of commissioners appointed by the President under the Communications Act of 1934, having the power to regulate all interstate and foreign communications by wire and radio originating in the United States.

fiber. See *optical fiber*.

fiber optic cable. See *optical cable*.

fiber optics. The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, and plastic.

Notes:

1. Telecommunication applications of fiber optics use optical fibers. Either a single discrete fiber or a nonspatially aligned fiber bundle may be used for each information channel. Such fibers are often called *optical fibers* to differentiate them from fibers used in noncommunication applications.
2. Various industrial and medical applications use (typically high-loss) flexible fiber bundles in which individual fibers are spatially aligned, permitting optical relay of an image.
3. Some specialized industrial applications use rigid (fused) aligned fiber bundles for image transfer.

Fiber Optic Terminal Adapter (FTA). In the 3174, this adapter allows a 3299 Model 032 to be attached to the 3174 using optical fiber cable.

field. On a data medium or a storage medium, a specified area used for a particular category of data; for example, a group of character positions used to enter or display wage rates on a panel. (T) See also *display field*.

field replaceable unit (FRU). An assembly that is replaced in its entirety when any one of its components fails. In some cases a FRU may contain other FRUs; for example, a brush and a brush block that can be replaced individually or as a single unit. Contrast with *customer replaceable unit (CRU)*.

file. A named set of records stored or processed as a unit. (T)

file adapter. In the 3174, an adapter that provides input/output support for external storage devices, such as a diskette drive.

file name. (1) A name assigned or declared for a file. (2) The name used by a program to identify a file.

FIS. First in segment

fixed disk. A rigid magnetic disk used in a fixed disk drive. Synonymous with *hard disk*.

fixed disk drive. A disk storage device that reads and writes on rigid magnetic disks. Synonymous with *hard disk drive*.

flag. A character or indicator that signals the occurrence of some condition, such as the setting of a switch, or the end of a word. (A)

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.

FMD. (1) Function management data. (2) Field macro diagram.

FQPCID. Fully qualified procedure correlator identifier.

FRMR. Frame reject response.

frame. (1) The unit of transmission in some LANs, including the IBM Token-Ring Network and the IBM PC Network. It includes delimiters, control characters, information, and checking characters. On a token-ring network, a frame is created from a token when the token has data appended to it. On a token bus network (IBM PC Network), all frames including the token frame contain a preamble, start delimiter, control address, optional data and checking characters, end delimiter, and are followed by a minimum silence period. (2) A housing for machine elements. (3) In synchronous data link control (SDLC), the vehicle for every command,

every response, and all information that is transmitted using SDLC procedures. Each frame begins and ends with a flag.

frame check sequence (FCS). (1) A system of error checking performed at both the sending and receiving station after a block check character has been accumulated. (2) A numeric value derived from the bits in a message that is used to check for any bit errors in transmission. (3) A redundancy check in which the check key is generated by a cyclic algorithm. (T) Synonymous with *cyclic redundancy check (CRC)*.

frame relay. (1) An interface standard describing the boundary between a user's equipment and a fast-packet network. In frame-relay systems, flawed frames are discarded; recovery comes end-to-end rather than hop-by-hop. (2) A technique derived from the integrated services digital network (ISDN) D channel standard. It assumes that connections are reliable and dispenses with the overhead of error detection and control within the network.

frequency. The rate of signal oscillation, expressed in hertz (cycles per second).

FRMR. Frame reject response.

from diskette. The diskette that provides the data to be transferred.

from drive. The drive that provides the data to be transferred.

FRU. Field-replaceable unit.

FTA. Fiber Optic Terminal Adapter.

full-duplex. Synonym for *duplex*.

fully qualified procedure correlator identifier (FQPCID). A network-unique identifier that is used for:

- Correlating messages sent between nodes, such as correlating a Locate search request with its replies.
- Identifying a session for problem determination and resolution.
- Identifying a session for accounting, auditing, and performance monitoring purposes.

It is normally assigned at the node that contains the LU for which a procedure or session is initiated, but may be assigned by the network node that is providing network services to that end node. The FQPCID consists of a fixed-length correlator concatenated with the network-qualified name of the control point that generated the correlator.

function. (1) A specific purpose of an entity, or its characteristic action. (A) (2) In data communications, a machine action such as carriage return or line feed. (3) In NetView DM, a function is the specification of a transmission activity on a resource or group of resources. Functions are grouped into phases. In CSCM, resources are known as data objects.

functional address. In IBM network adapters, a special kind of group address in which the address is bit-significant, each "on" bit representing a function performed by the station (such as "Active Monitor," "Ring Error Monitor," "LAN Error Monitor," or "Configuration Report Server").

function key. A key that can signal or initiate the performance of various actions or functions that are selected by the user or determined by an application program.

function management data (FMD). An RU category used for end-user data exchanged between logical units (LUs) and for requests and responses exchanged between network services components of LUs, PUs, and control points.

G

gateway. A device and its associated software that interconnect networks or systems of different architectures. The connection is usually made above the reference model network layer. For example, a gateway allows LANs access to System/370 host computers. Contrast with *bridge* and *router*.

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

get. In 3174 central site customizing, to select the type of data you want and store it in working copy.

group. (1) A set of related records that have the same value for a particular field in all records. (2) A collection of users who can share access authorities for protected resources. (3) A list of names that are known together by a single name.

group address. In a LAN, a locally administered address assigned to two or more adapters to allow the adapters to copy the same frame. Contrast *locally administered address* with *universally administered address*.

H

half-duplex. In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

HAP. Host addressable printer.

hard error. An error condition on a network that requires that the source of the error be removed or that the network be reconfigured before the network can resume reliable operation. See also *beaconing*. Contrast with *soft error*.

hardware. Physical equipment as opposed to programs, procedures, rules, and associated documentation. (I) (A)

header. The portion of a message that contains control information for the message such as one or more destination fields, name of the originating station, input sequence number, character string indicating the type of message, and priority level for the message.

hex. Hexadecimal.

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.

HNAD. Host network (DTE) address.

hop. In APPN, a portion of a route that has no intermediate nodes. It consists of only a single transmission group connecting adjacent nodes.

hop count. (1) On a Token-ring, the number of bridges through which a frame has passed on the way to its destination.

Note: Hop count applies to all broadcast frames except single-route broadcast frames. (2) In APPN, the number of network nodes traversed by a Locate search, or the number of APPN nodes traversed by a Bind for session establishment.

host addressable printer (HAP). A workstation-attached printer that a host can communicate with and to which other devices can local copy.

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

host computer. (1) In a computer network, a computer that provides end users with services such as computation and data bases and that usually performs

network control functions. (2) The primary or controlling computer in a multiple-computer installation. (3) A computer used to prepare programs for use on another computer or on another data processing system; for example, a computer used to compile link edit, or test programs to be used on another system. (4) Synonym for *host processor*.

host node. (1) A node at which a host processor is located. (2) In SNA, a subarea node that contains a system services control point (SSCP); for example, a System/370 computer with OS/VS2 and ACF/TCAM.

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

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

HPCA. High-performance communication adapter.

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.

IBM Personal Computer Disk Operating System (DOS). A disk operating system based on MS-DOS.

IEEE. Institute of Electrical and Electronic Engineers.

IEEE 802.3 interface. An interface adhering to the 802.3 Logical Link Control (LLC) Standard of the Institute of Electrical and Electronics Engineers. This standard is one of several standards for local area networks approved by the IEEE.

IML. Initial microcode load.

inactive. (1) Not operational. (2) Pertaining to a node or device not connected or not available for connection to another node or device. (3) Pertaining to a station that is only repeating frames or tokens, or both.

ind. Indicator.

individual address. An address that identifies a particular network adapter on a LAN. See also *locally administered address* and *universally administered address*.

initialize. In a LAN, to prepare the adapter (and adapter support code, if used) for use by an application program.

initial microcode load (IML). In the 3174, 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. (I) (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.

insert. To make an attaching device an active part of a LAN.

integrated services digital network (ISDN). A digital end-to-end telecommunication network that supports multiple services including, but not limited to, voice and data.

Note: ISDNs are used in public and private network architectures.

interaction. A basic unit used to record system activity, consisting of the acceptance of a line of terminal input, processing of the line, and a response, if any.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (I) (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. (A) (3) Hardware, software, or both, that links systems, programs, or devices.

interference. (1) The prevention of clear reception of broadcast signals. (2) The distorted portion of a received signal.

interrupt. (1) A suspension of a process, such as execution of a computer program, caused by an external event and performed in such a way that the process can be resumed. (A) (2) To stop a process in such a way that it can be resumed. (3) In data communication, to take an action at a receiving station that causes the sending station to end a transmission. (4) A means of passing processing control from one software or microcode module or routine to another, or

of requesting a particular software, microcode, or hardware function.

interrupt level. The means of identifying the source of an interrupt, the function requested by an interrupt, or the code or feature that provides a function or service.

I/O. Input/output.

IOCP. Input/output control program.

IOPT. Incoming call option.

ISDN. Integrated Services Digital Network.

J

jack. A connecting device to which a wire or wires of a circuit may be attached and which is arranged for insertion of a plug.

jumper. A connector between two pins on a network adapter that enables or disables an adapter option, feature, or parameter value.

L

LAN. Local area network.

LAN adapter. The circuit card within a communicating device (such as a personal computer) that, together with its associated software, enables the device to be attached to a LAN.

LAN segment. (1) Any portion of a LAN (for example, a single bus or ring) that can operate independently but is connected to other parts of the establishment network via bridges. (2) An entire ring or bus network without bridges. See *cable segment* and *ring segment*.

LAPB. Link access procedure balanced.

layer. (1) One of the seven levels of the Open Systems Interconnection reference model. (2) In open systems architecture, a collection of related functions that comprise one level of hierarchy of functions. Each layer specifies its own functions and assumes that lower level functions are provided. (3) In SNA, a grouping of related functions that are logically separate from the functions of other layers. Implementation of the functions in one layer can be changed without affecting functions in other layers.

LCID. Logical channel identifier.

leased line. Synonym for *nonswitched line*.

LED. Light-emitting diode.

LEN. Low-entry networking.

LEN end node. See *low-entry networking (LEN)*.

LFU. Limited Function Utility.

LIC. (1) Licensed Internal Code (2) Last in chain.

Licensed Internal Code (LIC). (1) Microcode that IBM does not sell as part of a machine but licenses to the customer, as designated in the Supplement to Agreement for Purchase of IBM Machines.

(2) Licensed Internal Code is implemented in a part of storage that is not addressable by user programs. It is used in a product to implement functions as an alternative to hard-wired circuitry. LIC is provided in accordance with the terms and conditions of the applicable written agreement between a customer and IBM. See also *microcode*

light pen. A light-sensitive pick device that is used by pointing it at the display surface.

limited broadcast. Synonym for *single-route broadcast*.

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, Identify Customizing Keyboard, and Media Management. The Limited Function Utility diskette is used mainly in networks that are under central site control.

line noise. Noise originating in a telecommunication line.

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).

line switching. Synonym for *circuit switching*.

link. (1) The logical connection between nodes including the end-to-end link control procedures. (2) The combination of physical media, protocols, and programming that connects devices on a network. (3) In computer programming, the part of a program, in some cases a single instruction or an address, that passes control and parameters between separate portions of the computer program. (I) (A) (4) To interconnect items of data or portions of one or more computer programs. (5) In SNA, the combination of the link connection and link stations joining network nodes.

link-attached. Pertaining to the attachment of devices to a central computer through a communication control unit. Contrast with *channel-attached*. Deprecated term for *telecommunication-attached*.

link connection. (1) All physical components and protocol machines that lie between the communicating link stations of a link. The link connection may include a switched or leased physical data circuit, a LAN, or an X.25 virtual circuit. (2) In SNA, the physical equipment providing two-way communication and error correction and detection between one link station and one or more other link stations.

link station. (1) A specific place in a service access point (SAP) 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. (3) A logical point within a SAP that enables an adapter to establish connection-oriented communication with another adapter. (4) In SNA, the combination of hardware and software that allows a node to attach to and provide control for a link.

LLC. Logical link control.

LMI. Local management interface.

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*.

local area network (LAN). A computer network located on a user's premises within a limited geographical area.

Note: Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T)

local busy. A state that may occur on a network for a given link station during which information-frame reception is suspended. This condition may occur because of an application program request, or a lack of buffers in the service access point (SAP) buffer pool.

locally administered address. An adapter address that the user can assign to override the universally administered address. Contrast with *universally administered address*.

location. With reference to the 3174, a place within the 3174 chassis where a particular card or adapter is inserted.

logical connection. In a network, devices that can communicate or work with one another because they share the same protocol. See also *physical connection*.

logical link control (LLC) sublayer. One of two sublayers of the ISO Open Systems Interconnection

data link layer (which corresponds to the SNA data link control layer), proposed for LANs by the IEEE Project 802 Committee on Local Area Networks and the European Computer Manufacturers Association (ECMA). It includes those functions unique to the particular link control procedures that are associated with the attached node and are independent of the medium; this allows different logical link protocols to coexist on the same network without interfering with each other. The LLC sublayer uses services provided by the medium access control (MAC) sublayer and provides services to the network layer.

logical link control protocol (LLC protocol). In a local area network, the protocol that governs the exchange of frames between data stations independently of how the transmission medium is shared. (T)

logical terminal (LT). In MLT, one of five sessions available to share one display station.

logical unit (LU). A type of network accessible unit that enables end users to communicate with each other and gain access to network resources.

loop. A closed unidirectional signal path connecting input/output devices to a network.

low-entry networking (LEN). A capability in type 2.1 nodes allowing them to be directly attached to one another using peer-to-peer protocols and allowing them to support multiple and parallel sessions between logical units.

LU type. The classification of an LU in terms of the specific subset of SNA protocols and options it supports for a given session, namely:

- The mandatory and optional values allowed in the session activation request.
- The usage of data stream controls, function management headers (FMHs), request unit parameters, and sense data values.
- Presentation services protocols such as those associated with FMH usage.

LU types 0, 1, 2, 3, 4, 6.1, 6.2, and 7 are defined.

M

MAC. (1) Medium access control. (2) Message authentication code.

MAC frame. Frames used to carry information to maintain the ring protocol and for exchange of management information.

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.

management services (MS). One of the types of network services in control points and physical units. Management services are the services provided to assist in the management of SNA networks, such as problem management, performance and accounting management, configuration management, and change management.

manual answering. (1) Answering in which a call is established only if the called user signals a readiness to receive the call by means of a manual operation. (2) Operator actions to prepare a station to receive a call on a switched line. Contrast with *automatic answering*.

manual calling. (1) Calling that permits the entry of selection signals from a calling data station at an undefined character rate. (2) Operator actions to place a call over a switched line. Contrast with *automatic calling*.

Manufacturing Automation Protocol (MAP). A broadband LAN with a bus topology that passes tokens from adapter to adapter on a coaxial cable.

MAP. (1) Maintenance analysis procedure. (2) Manufacturing Automation Protocol

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.

max. Maximum.

Mbps. Megabits per second.

medium. A physical carrier of electrical or optical energy.

medium access control (MAC) frame. (1) In a ring network, an address resolution request frame that has the unique part of a destination address and an "all rings" address. A sender issues this request to determine the ring where the destination node is located and whether the node is active. (2) In a ring network, a response from an active destination node to the requesting source node that has its complete address and ring number.

medium access control (MAC) protocol. In a local area network, the part of the protocol that governs communication on the transmission medium without

concern for 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. (T) See also *logical link control protocol*.

medium access control sublayer (MAC sublayer). In a local area network, the part of the data link layer that applies medium access control and supports topology-dependent functions. The MAC sublayer uses the services of the physical layer to provide services to the logical link control sublayer and all higher layers. (T)

megabyte (MB). A unit of measure for data. 1 megabyte = 1 048 576 bytes.

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*.

memory mapped I/O (MMIO). In 3174, a method of accessing certain adapters as if an adapter was a memory location.

merged. In an IBM Token-Ring Network, pertaining to an IBM access control unit that has successfully joined the main ring path. Neither the ring in (RI) nor ring out (RO) data signal of the access control unit has been switched to the backup path.

message. (1) A logical partition of the user device's data stream to and from the adapter. (2) A group of characters and control bits transferred as an entity.

MHS. Magnetic hand scanner.

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. (4) See also *microprogram*.

Note: The term microcode represents microinstructions used in a product as an alternative to hard-wired circuitry to implement functions of a processor or other system component. The term microprogram means a dynamic arrangement of one or more groups of microinstructions for execution to perform a certain function. (5) See also *licensed internal code (LIC)*.

microprogram. A sequence of microinstructions (T) that when executed performs a preplanned function.

MLT. Multiple Logical Terminals.

MMIO. Memory mapped input/output.

modem. Modulator-demodulator.

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.

mode name. The name used by the initiator of a session to designate the characteristics desired for the session, such as traffic pacing values, message-length limits, sync point and cryptography options, and the class of service within the transport network.

monitor. (1) A functional unit that observes and records selected activities for analysis within a data processing system. Possible uses are to show significant departures from the norm, or to determine levels of utilization of particular functional units. (I) (A) (2) Software or hardware that observes, supervises, controls, or verifies operations of a system. (A)

MSR. Magnetic stripe reader.

multidrop (network). A network configuration in which there are one or more intermediate nodes on the path between a central node and an endpoint node.

multiple logical terminal (MLT). In the 3174, a function that provides a CUT-attached, fixed-function display station with the ability to interact with as many as five host sessions. Each session is processed as though it were a separate display station.

multistation access unit. In the IBM Token-Ring Network, a wiring concentrator that can connect up to eight lobes to a ring.

MVS. Multiple virtual storage.

N

name. An alphanumeric term that identifies a data set, statement, program, or cataloged procedure.

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

n-bit byte. A string that consists of n bits. (T)

NCP. Network Control Program.

NETID. Network identifier.

NetView. A host-based IBM licensed program that provides communication network management (CNM) or communications and systems management (C&SM) services.

network. (1) A configuration of data processing devices and software connected for information

interchange. (2) An arrangement of nodes and connecting branches. Connections are made between data stations. (T)

network administrator. A person who manages the use and maintenance of a network.

network architecture. The logical structure and operating principles of a computer network. (T) See also *systems network architecture (SNA)* and *Open Systems Interconnection (OSI) architecture*.

Note: The operating principles of a network include those of services, functions, and protocols.

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).

network management. The conceptual control element of a station that interfaces with all of the architectural layers of that station and is responsible for the resetting and setting of control parameters, obtaining reports of error conditions, and determining if the station should be connected to or disconnected from the network.

network management vector transport (NMVT). The portion of an alert transport frame that contains the alert message.

network manager. A program or group of programs that is used to monitor, manage, and diagnose the problems of a network.

network node (NN). A node that can define the paths or routes, control route selection, and handle directory services for APPN.

Network Problem Determination Application (NPDA). An IBM licensed program that helps the user identify network problems from a central control point using interactive display techniques.

NMVT. Network Management Vector Transport.

no carrier. On broadband networks, a condition in which a carrier signal is not being broadcast on a given frequency. In the absence of such a carrier, no information can be modulated on that frequency.

node. (1) Any device, attached to a network, that transmits and/or receives data. (2) An endpoint of a link, or a junction common to two or more links in a network. (3) In a network, a point where one or more functional units interconnect transmission lines.

node type. A designation of a node according to the protocols it supports and the network accessible units that it can contain. Five types are defined: 1, 2.0, 2.1,

4, and 5. Within a subarea network, type 1, type 2.0, and type 2.1 nodes are peripheral nodes, while type 4 and type 5 nodes are subarea nodes.

noise. (1) A disturbance that affects a signal and that can distort the information carried by the signal. (T) (2) Random variations of one or more characteristics of any entity, such as voltage, current, or data. (A) (3) Loosely, any disturbance tending to interfere with normal operation of a device or system. (A)

non-broadcast frame. A frame containing a specific destination address and that may contain routing information specifying which bridges are to forward it. A bridge will forward a non-broadcast frame only if that bridge is included in the frame's routing information.

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*.

NPDA. Network Problem Determination Application.

NPKT. Negotiated packet size.

NRZ. Nonreturn to zero.

NTRI. NCP Token-Ring Interconnection.

NTT. Nippon Telephone and Telegraph.

null modem. A device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D cable. The null modem does the crossing-over of the appropriate EIA 232D leads required for the direct connection of a terminal or computer to an AEA port.

NUM. Numeric.

NWND. Negotiated window size.

O

office. See *work area*.

offline test. In the 3174, 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.

OIA. Operator information area.

OLTS. Online test system.

OLU. Origin logical unit.

online test. In the 3174, a diagnostic test or data collection program that is run without interrupting the normal operation of the 3174 and its associated terminals.

online test system (OLTS). A system that allows a user to test I/O devices concurrently with execution of programs. Tests may be run to diagnose I/O errors, verify repairs and engineering changes, or to check devices periodically.

OOPT. Outgoing call option.

open. (1) To make an adapter ready for use. (2) A break in an electrical circuit. (3) To make a file ready for use.

Open Systems Interconnection (OSI). (1) The interconnection of open systems in accordance with specific ISO standards. (T) (2) The use of standardized procedures to enable the interconnection of data processing systems.

Note: OSI architecture establishes a framework for coordinating the development of current and future standards for the interconnection of computer systems. Network functions are divided into seven layers. Each layer represents a group of related data processing and communication functions that can be carried out in a standard way to support different applications.

Open Systems Interconnection (OSI) architecture. Network architecture that adheres to a particular set of ISO standards that relates to Open Systems Interconnection. (T)

Open Systems Interconnection (OSI) reference model. A model that represents the hierarchical arrangement of the seven layers described by the Open Systems Interconnection architecture.

operation. (1) A defined action, namely, the act of obtaining a result from one or more operands in accordance with a rule that completely specifies the result for any permissible combination of operands. (A) (2) A program step undertaken or executed by a computer. (3) An action performed on one or more data items, such as adding, multiplying, comparing, or moving.

operator information area (OIA). The area below the line near the bottom of the display area where graphics and alphanumeric characters are displayed to define the status of the terminal or the system to the operator.

optical cable. A fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications.

optical fiber. Any filament made of dielectric materials that guides light, regardless of its ability to send signals. (E) See also *fiber optics* and *optical waveguide*.

optical fiber cable. Synonym for *optical cable*.

option. (1) A specification in a statement, a selection from a menu, or a setting of a switch, that may be used to influence the execution of a program. (2) A hardware or software function that may be selected or enabled as part of a configuration process. (3) A piece of hardware (such as a network adapter) that can be installed in a device to modify or enhance device function.

overflow exception. A condition caused by the result of an arithmetic operation having a magnitude that exceeds the largest possible number. See also *underflow exception*.

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.

packet. (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. (1) (2) Synonymous with *data frame*. Contrast with *frame*.

page. (1) The portion of a panel that is shown on a display surface at one time. (2) To move back and forth among the pages of a multiple-page panel. See also *scroll*. (3) In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between real storage and virtual storage.

panel. The complete set of formatted information that appears in a single display on a visual display unit.

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. (1) (A) (2) An item in a menu or for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

parity. (1) A transmission error-checking scheme in which an extra bit is added to some unit of data, usually a byte, in order to make the total number of one bits even or odd. For the AEA feature, odd, even, mark, space, or no-parity coding is supported. No-parity means that no parity bit is sent or expected. Mark and space mean that the parity position is always set to one or zero, respectively, and that received parity is not checked. (2) The state of being either even-numbered or odd-numbered.

parity (even). A condition when the sum of all of the digits in an array of binary digits is even.

parity (odd). A condition when the sum of all of the digits in an array of binary digits is odd.

parity check. (1) A redundancy check by which a recalculated parity bit is compared to the pre-given parity bit. (T) (2) A check that tests whether the number of ones (or zeros) in an array of binary digits is odd or even. (A)

password. In computer security, a string of characters known to the computer system and a user, who must specify it to gain full or limited access to a system and to the data stored within it.

patch panel. A terminating enclosure for connecting cables. See *Distribution Panel*.

path. (1) In a network, any route between any two nodes. (T) (2) The route traversed by the information exchanged between two attaching devices in a network. (3) A command in IBM Personal Computer Disk Operating System (PC DOS) and IBM Operating System/2 (OS/2) that specifies directories to be searched for commands or batch files that are not found by a search of the current directory.

PBX. Private branch exchange.

permanent virtual circuit (PVC). In X.25 and frame-relay communications, a virtual circuit that has a logical channel permanently assigned to it at each data terminal equipment (DTE). Call-establishment protocols are not required. Contrast with *switched virtual circuit (SVC)*.

personal computer (PC). A desk-top, free-standing, or portable microcomputer that usually consists of a system unit, a display, a monitor, a keyboard, one or more diskette drives, internal fixed-disk storage, and an

optional printer. PCs are designed primarily to give independent computing power to a single user and are inexpensively priced for purchase by individuals or small businesses. Examples include the various models of the IBM Personal Computers, and the IBM Personal System/2 computer.

phase. The relative timing (position) of periodic electrical signals.

physical connection. (1) A connection that establishes an electrical circuit. (2) In ACF/VTAM, a point-to-point connection or multipoint connection.

physical layer. In the Open Systems Interconnection reference model, the layer that provides the mechanical, electrical, functional, and procedural means to establish, maintain, and release physical connections over the transmission medium. (T)

physical unit (PU). The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 1, type 2, type 4, and type 5 nodes only.

PIO. Programmed input/output.

PLU. Primary logical unit.

plug. (1) A connector designed to insert into a receptacle or socket. (2) To insert a connector into a receptacle or socket.

P/N. Part number.

polling. (1) On a multipoint connection or a point-to-point connection, the process whereby data stations are invited one at a time to transmit. (2) Interrogation of devices for such purposes as to avoid contention, to determine operational status, or to determine readiness to send or receive data.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. Synonymous with *socket*.

Port Expansion Feature. In the 3174, an optional feature that allows up to 32 additional 3270 type terminals to be attached. This feature provides a new terminal adapter for specific large-cluster models of the 3174.

primary logical unit (PLU). In SNA, the logical unit (LU) that contains the primary half-session for a particular LU-LU session. Contrast with *secondary logical unit*.

printer authorization matrix (PAM). A matrix stored in the controller that establishes printer assignment and classification.

private branch exchange (PBX). (1) A private telephone exchange, automatic or manual, that provides for the transmission of calls to and from the public telephone network. (2) Technology used to interconnect different types of equipment (computer terminals, printers) and exchange different forms of information (data and voice).

procedure. A set of instructions that gives a service representative a step-by-step procedure for tracing a symptom to the cause of failure.

processor. In a computer, a functional unit that interprets and executes instructions. (I) (A)

programmed I/O (PIO). In an IBM personal computer (PC), a method of accessing an input or output port with specific instructions.

programmed symbols (PS). In the 3270 Information Display System, an optional feature that stores up to six user-definable, program-loadable character sets of 190 characters each in terminal read/write storage for display or printing by the terminal.

protocol. (1) A set of semantic and syntactic rules that determines 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. (3) A specification for the format and relative timing of information exchanged between communicating parties.

protocol conversion. For the AEA feature, emulation of one device protocol by a device designed for a different protocol.

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

PSDN. Packet switched data network.

PUID. Physical unit identification.

put. In 3174 central site customizing, to store data from the working copy into a library member.

PVC. Permanent virtual circuit.

Q

QLLC. Qualified logical link control.

QSM. Qualified set mode.

R

rack. Synonym for *equipment rack*.

RAM. Random access memory.

random access memory (RAM). A computer's or adapter's volatile storage area into which data may be entered and retrieved in a nonsequential manner.

RCV. Receive.

receive. To obtain and store information transmitted from a device.

receptacle. Electrically, a fitting equipped to receive a plug and used to complete a data connection or electrical path. See also *lobe receptacle*.

register. (1) A storage area in a computer's memory where specific data is stored. (2) A storage device having a specified storage capacity such as bit, byte, or computer word, and usually intended for a special purpose. (I)

rel. Relative.

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line.

remove. (1) To take an attaching device off a network. (2) To stop an adapter from participating in passing data on a network.

Req. Request.

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 value (usually hexadecimal) provided by an adapter or a program to indicate the result of an action, command, or operation. (2) A code used to influence the execution of succeeding instructions. (A)

ring error monitor (REM). A function that compiles error statistics reported by adapters on a network.

analyzes the statistics to determine probable error cause, sends reports to network manager programs, and updates network status conditions. It assists in fault isolation and correction.

ring network. A network configuration in which a series of attaching devices is connected by unidirectional transmission links to form a closed path. A ring of an IBM Token-Ring Network is referred to as a LAN segment or as a Token-Ring Network segment.

ring segment. A ring segment is any section of a ring that can be isolated (by unplugging connectors) from the rest of the ring. A segment can consist of a single lobe, the cable between access units, or a combination of cables, lobes, and/or access units. See *cable segment* and *LAN segment*.

ring station. A station that supports the functions necessary for connecting to the LAN and for operating with the token-ring protocols. These include token handling, transferring copied frames from the ring to the using node's storage, maintaining error counters, observing medium access control (MAC) sublayer protocols (for address acquisition, error reporting, or other duties), and (in the full-function native mode) directing frames to the correct data link control (DLC) link station.

ring status. The condition of the ring.

RLSD. Receive Line Signal Detect.

RNR. (1) Request not ready. (2) receive not ready.

ROS. Read-only storage.

route. An ordered sequence of nodes and transmission groups (TGs) that represent a path from an origin node to a destination node traversed by the traffic exchanged between them.

router. An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. Contrast with *bridge* and *gateway*.

routine. Part of a program, or a sequence of instructions called by a program, that may have some general or frequent use.

routing. (1) The assignment of the path by which a message will reach its destination. (2) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

RPOA. Recognized Private Operating Agency.

RPQ. Request for price quotation.

RTM. Response Time Monitor.

RTS. Request to send.

S

SAA. Systems Application Architecture.

SABME. Set Asynchronous Balance Mode Extended (command).

SAP. Service access point.

SBA. Set Buffer Address.

SCR. Silicon-controlled rectifier.

scroll. To move a display image vertically or horizontally to display data that cannot be observed within the boundaries of the display screen.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

secondary logical unit (SLU). In SNA, the logical unit (LU) that contains the secondary half-session for a particular LU-LU session. Contrast with *primary logical unit*.

segment. A section of cable between components or devices on the network. A segment may consist of a single patch cable, multiple patch cables connected, or a combination of building cable and patch cables connected. See *cable segment*, *LAN segment*, and *ring segment*.

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*.

server. (1) A device, program, or code module on a network dedicated to providing a specific service to a network. (2) On a LAN, a data station that provides facilities to other data stations. Examples are a file server, print server, and mail server.

service access point (SAP). (1) 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. (2) In Open Systems Interconnection (OSI) architecture, the logical point at which an $n + 1$ -layer entity acquires the services of the n -layer. For LANs, the n -layer is assumed to be data link control (DLC). A single SAP can have many links terminating in it. These link "end-points" are represented in DLC by link stations. (3) A logical address that allows a system to route data between a remote device and the appropriate communications support.

session. (1) A connection between two application programs that allows them to communicate. (2) In SNA, a logical connection between two network addressable units that can be activated, tailored to provide various protocols, and deactivated as requested. (3) The data transport connection resulting from a call or link between two devices. (4) The period of time during which a user of a node can communicate with an interactive system, usually the elapsed time between log on and log off. (5) In network architecture, an association of facilities necessary for establishing, maintaining, and releasing connections for communication between stations. (T)

Set Buffer Address (SBA) order. An order that sets the buffer address to a specified location.

SHM. Short-hold mode.

signal. (1) A time-dependent value attached to a physical phenomenon for conveying data. (2) A variation of a physical quantity, used to convey data.

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*.

single-route broadcast. The forwarding of specially designated broadcast frames only by bridges which have single-route broadcast enabled. If the network is configured correctly, a single-route broadcast frame will have exactly one copy delivered to every LAN segment in the network. Synonymous with *limited broadcast*. See also *automatic single-route broadcast*.

SLU. Secondary logical unit.

SNA. Systems Network Architecture.

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.

SNAP. subnetwork access program.

SNRM. Set Normal Response Mode.

socket. Synonym for *port* (2).

SOEMI. Serial Original Equipment Manufacturer Interface.

soft error. An intermittent error on a network that causes data to have to be transmitted more than once to be received. A soft error affects the network's performance but does not, by itself, affect the network's overall reliability. If the number of soft errors becomes excessive, reliability is affected. Contrast with *hard error*.

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.

source address. Synonym for origin address.

SRB. system request block

SSB. system status block

SSCP. System services control 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.

SUB. Substitute.

subarea. A portion of the SNA network consisting of a subarea node, any attached peripheral nodes, and their associated resources. Within a subarea node, all network accessible units, links, and adjacent link stations (in attached peripheral or subarea nodes) that are addressable within the subarea share a common subarea address and have distinct element addresses.

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.

SVC. Switched virtual circuit.

switch. On an adapter, a mechanism used to select a value for, enable, or disable a configurable option or feature.

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. (I) (A)
(2) Occurring with a regular or predictable timing relationship.

synchronous data link control (SDLC). A discipline conforming to subsets of the Advanced 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. (I)

SYSGEN. System generation.

system. In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions. (I) (A)

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

system generation (SYSGEN). The process of selecting optional parts of an operating system and of creating a particular operation system tailored to the

requirements of a data processing installation. (I) (A)
System generation enables a host computer to identify and communicate with the I/O devices connected to it.

Systems Application Architecture (SAA). An architecture developed by IBM that consists of a set of selected software interfaces, conventions, and protocols, and that serves as a common framework for application development, portability, and use across different IBM hardware systems.

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 (PUs) and logical units (LUs) 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.

Note: The layered structure of SNA allows the ultimate origins and destinations of information, that is, the end users, to be independent of and unaffected by the specific SNA network services and facilities used for information exchange.

T

tailgate. The area of a computer or control unit where I/O cables are connected.

TCLS. Throughput class negotiation.

telecommunication-attached. Pertaining to the attachment of devices by teleprocessing lines to a host processor. Synonym for *remote*. Contrast with *channel-attached*.

telecommunication control unit. See *communication controller*.

telephone twisted pair. One or more twisted pairs of copper wire in the unshielded voice-grade cable commonly used to connect a telephone to its wall jack. Also referred to as "unshielded twisted pair" (UTP).

telephone twisted pair terminal multiplexer adapter (TTP TMA). In the 3174, a feature that allows attachment of up to thirty-two 3270-type devices (displays and printers) to the controller through two 25-pair telephone twisted-pair cables, meeting IBM Cabling System (ICS) Type 3 specifications.

Telnet. In TCP/IP, an application protocol that allows a user at one site to access a remote system as if the user's display station were locally attached. Telnet uses the Transmission Control Protocol as the underlying protocol.

terminal. In data communication, a device, usually equipped with a keyboard and display device, capable of sending and receiving information.

terminal adapter (TA). In the 3174, an adapter that provides control for a maximum of 32 terminals per adapter. The maximum number of terminals that can be connected depends on the model of 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 cable.

terminal multiplexer adapter (TMA). In the 3174, this adapter is connected to the 3174 terminal adapter (TA) and provides control for a maximum of eight terminals.

terminal node. (1) In a hierarchical data base, a node that has no subordinate records or segments. (2) In SNA products, a peripheral node that is not user-programmable and has less processing capability than a cluster controller node. Examples are nodes consisting of the IBM 3277 Data Station, 3767 Communication Terminal, 3614 Consumer Transaction Facility, and 3624 Consumer Transaction Facility.

terminal port. (1) In a network, the functional unit of a node through which data can enter or leave the network. (2) The part of a processor that is dedicated to a single data channel for the purpose of receiving data from or transferring data to one or more external or remote devices.

terminal type menu. A list of all the available names and terminal types for a given port.

terminator. A 75-ohm, resistive connector used on the end of a cable or an unused tap to minimize cable reflections.

threshold. (1) A level, point, or value above which something is true or will take place and below which it is not true or will not take place. (2) In IBM bridge

programs, a value set for the maximum number of frames that are not forwarded across a bridge due to errors, before a "threshold exceeded" occurrence is counted and indicated to network management programs. (3) An initial value from which a counter is decremented to zero, or a value to which a counter is incremented or decremented from an initial value. When the counter reaches zero or the threshold value, a decision is made and/or an event occurs.

throughput. (1) A measure of the amount of work performed by a computer system over a given period of time, for example, number of jobs per day. (1) (A) (2) A measure of the amount of information transmitted over a network in a given period of time. For example, a network's data transfer rate is usually measured in bits per second.

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.

TMA. Terminal Multiplexer Adapter.

to diskette. The diskette that receives the transferred data.

to drive. The drive that receives the transferred data.

token. A sequence of bits passed from one device to another on the token-ring network that signifies permission to transmit over the network. It consists of a starting delimiter, an access control field, and an end delimiter. The access control field contains a bit that indicates to a receiving device that the token is ready to accept information. If a device has data to send along the network, it appends the data to the token. When data is appended, the token then becomes a frame. See *frame*.

token ring. A network with a ring topology that passes tokens from one attaching device (node) to another. A node that is ready to send can capture a token and insert data for transmission.

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 and is removed by the transmitting station. (T) The IBM Token-Ring Network is a baseband LAN with a star-wired ring topology that passes tokens from network adapter to network adapter. (2) A network that uses a ring topology, in which tokens are passed in a sequence from node to node. A node that is ready to

send can capture the token and insert data for transmission. (3) A group of interconnected token rings.

trace. (1) A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (2) A record of the frames and bytes transmitted on a network.

transaction. In an SNA network, an exchange between two programs that usually involves a specific set of initial input data that causes the execution of a specific task or job. Examples of transactions include the entry of a customer's deposit that results in the updating of the customer's balance, and the transfer of a message to one or more destination points.

transceiver. Any device that can transmit and receive traffic.

transfer rate. See *data transfer rate*.

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of protocols that allow cooperating computers to share resources across a heterogeneous network.

transmission control unit (TCU). A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit, for example, the IBM 2702 and 2703 Transmission Controls. Contrast with *communication controller*. Synonymous with *telecommunication control unit*.

transmission group (TG). A group of links between adjacent subarea nodes appearing as a single logical link for routing of messages. A transmission group may consist of one or more SDLC links (parallel links) or of a single System/370 channel. In APPN, transmission group is synonymous with *link*.

transmit. To send information from one place for reception elsewhere.

transmitter. See *universal receiver-transmitter*.

transmitter. (1) A circuit used in data communication applications to send information from one place for reception elsewhere. (2) The device in which the transmission circuits are housed.

TTP TMA. Telephone Twisted-Pair Terminal Multiplexer Adapter.

twisted pair. A transmission medium that consists of two insulated conductors twisted together to reduce noise. (T)

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

type 1 communication adapter. In the 3174, the adapter that provides EIA 232D/CCITT V.24 or CCITT V.35 interfaces for SDLC, BSC, X.25, or frame-relay remote link attachment. The user selects the appropriate interface.

type 2 communication adapter. In the 3174, the adapter that provides CCITT V.11 (X.21) interface for SDLC, X.25, or frame-relay remote link attachment. The user selects the interface.

U

U.S. United States.

UCW. Unit control word.

unbind. In SNA, to deactivate a session between logical units.

underflow exception. A condition caused by the result of an arithmetic operation having a magnitude less than the smallest possible nonzero number.

universally administered address. The address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique. Contrast with *locally administered address*.

universal receiver-transmitter. A circuit used in asynchronous, synchronous, or synchronous/asynchronous data communication applications to provide all the necessary logic to recover data in a serial-in parallel-out fashion and to transmit data in a parallel-in serial-out fashion. It is usually duplex; that is, it can transmit and receive simultaneously with the option to handle various data word lengths.

update. In 3174 central site customizing, to tailor a library member's customizing data, in working copy, and put it back to the library disk.

upgrade. In 3174 central site customizing, to select a library member and upgrade its data to the microcode level of the Central Site Customizing Utility disk.

upstream. (1) In the direction opposite to data flow or toward the source of transmission. (2) Toward the processor from an attached unit or end user. (3) Contrast with *downstream*.

Utility (UTL) diskette. In the 3174, a diskette that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

Utility disk. In the 3174, a diskette or fixed disk that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

V

V.35 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and conforms to the CCITT V.35 standard.

variable. (1) In computer programming, a character or group of characters that refers to a value and, in the execution of a computer program, corresponds to an address. (2) A quantity that can assume any of a given set of values. (A)

V dc. Volts direct current.

vector. One or more related fields of data, in a specified format. A quantity usually characterized by an ordered set of numbers. (I) (A)

version. A separate IBM-licensed program, based on an existing IBM-licensed program, that usually has significant new code or new function.

virtual circuit. (1) In packet switching, the facilities provided by a network that give the appearance to the user of an actual connection. (T) See also *data circuit*. Contrast with *physical circuit* (2) A logical connection established between two DTEs. (3) In a packet-switching data network, a logical end-to-end transmission channel—as opposed to a physical connection—that connects X.25 users. Virtual circuits allow physical transmission facilities to be shared by many users simultaneously. A virtual circuit is a logical connection established between two data terminal equipments (DTEs). See also *permanent virtual circuit (PVC)*.

VPD. Vital Product Data.

VTAM. Virtual Telecommunications Access Method.

W

WAN. Wide area network.

WCC. Write control character.

wide area network (WAN). A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) Contrast with *local area network (LAN)*.

wideband. Synonym for *broadband*.

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 terminal devices (such as displays, keyboards, and printers) are located. Access units may also be located in work areas.

workstation. (1) An I/O device that allows either transmission of data or the reception of data (or both) from a host system, as needed to perform a job: for example, a display station or printer. (2) A configuration of I/O equipment at which an operator works. (T) (3) A terminal or microcomputer, usually one connected to a mainframe or network, at which a user can perform tasks.

Workstation Networking Module (WNM). In the 8250 and 8260, a module that provides 3174 Establishment Controller 3270 connectivity and type 1 communication functions.

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.

WSF. Write Structured Field.

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.

XID. -Exchange identification.

XOFF. Transmitter off.

XON. Transmitter on.

3174 Peer Communication (3174-Peer). A network of personal computers, with adapter support and associated program interfaces, attached with 3270 wiring to a 3174 that has the associated microcode installed. The personal computers attached to the 3174 communicate as if they were Token-Ring LAN devices.

3270 data stream. (1) The commands, control codes, orders, attributes, and data or structured fields for 3270

devices, that are transmitted inbound to an application program or outbound to a terminal. (2) Data being transferred from or to an allocated primary or tertiary device, or to the host system, as a continuous stream of data and 3270 Information Display System control elements in character form.

3270 emulation. The use of a program that allows a device or system such as a personal computer or a System/38 to operate in conjunction with a host system as if it were a 3270-series display station or control unit.

3270 Port Expansion Feature. In the 3174, an optional terminal adapter and the required microcode that allows the 3174 to support an additional 32 terminals. This adapter is available only on large cluster models of the 3174.

Index

Numerics

- 3174 acoustics 1-44
- 3174 configurations
 - component locations 3-2
 - Terminal Adapter attachment 1-7
- 3174 Display Subsystem OLTs 2-317
- 3174 dump diskette 1-37
- 3174 error during dump, analyzing 2-312
- 3174 Establishment Controller
 - component locations 3-2
 - file adapter 1-22
 - fixed disk drive 1-22
 - general description 1-19
 - general information 1-3
 - hardware group numbers 1-21
 - maximum AEAs 1-12
 - models 1-5
 - non-SNA compatibility 1-5
 - service strategy 1-4
 - SNA compatibility 1-5
 - Type 1 communication adapter B-2
 - X.25 SVC capability B-16
- 3174 FRU
 - AEA (HG 21, 22, 23) 1-22
 - channel adapter HG 16 1-22
 - connection adapter, ESCON HG 17 1-22
 - descriptions and functions 1-21
 - diskette drives HG 01 or 02 1-21
 - Enterprise Systems Connection Adapter (HG 17) 1-22
 - Ethernet adapter HG 41 1-24
 - fiber optic terminal adapter (HG 26 and HG 27) 1-23
 - file adapter (HG 01) 1-22
 - fixed disk drive (HG 03) 1-22
 - hardware configuration table 1-25
 - hardware group number assignments 1-21
 - ISDN adapter HG 36-39 1-24
 - operator panel HG 09 1-22
 - operator panel module 1-25
 - planar board 1-24
 - problem determination 2-3
 - replacement strategy 2-3
 - storage card (1MB) HG 87 1-24
 - storage card (2MB) HG 87 1-24
 - storage card (4MB) HG 87 1-24
 - storage card (6MB) HG 87 1-24
 - telephone twisted-pair terminal multiplexer adapter (HG 26 and HG 27) 1-23
 - terminal adapter HG 26 and HG 27 1-23
 - terminal multiplexer adapter (HG 26 and HG 27) 1-23
- 3174 FRU (*continued*)
 - Token-Ring adapter HG 31 1-23
 - Type 1 communication adapter HG 11 1-22
- 3174 general description
 - AEA 1-12
 - base hardware 1-5
 - data flow 1-19
- 3174 hardware
 - additional features 1-5
 - AEA 1-12
 - base configuration 1-5
 - base hardware 1-5
 - Terminal Adapter attachment 1-7
- 3174 operator functions online test 2-253
- 3174 temperature and humidity limits 1-44
- 3270 device status 2-175
- 3270 host status summary online test 2-256
- 3299 interchangeability A-4
- 3299 Reference Information
 - 3299 Model 1 A-2
 - 3299 Model 1X4 A-2
 - 3299 Model 2 A-2
 - 3299 Model 3 A-2
 - 3299 Model 32 A-3
 - 3299 Model 32T A-3
 - description A-2
- 3299 Terminal Multiplexer A-2
- 87, storage test 2-97

A

- AC voltage check 2-293
- adding a patch 2-304
- Advance push button 1-38
- advanced peer-to-peer networking online test 2-268
- AEA
 - See asynchronous emulation adapter (AEA)*
 - AEA connector to modem pin assignments 2-135
 - AEA to terminal pin assignments 2-130
 - alerts, operator-originated 2-246
- Alt 1 IML operations
 - normal IML description 1-41
 - normal IML procedure 1-41
- Alt 1 push button 1-38
- Alt 2 procedures
 - Alt 2 IML description 1-43
- Alt 2 push button 1-38
- asynchronous emulation adapter (AEA)
 - ASCII devices 1-22
 - bus interface 1-22
 - external cables 2-130
 - modem specifications and switch settings 2-297

- asynchronous emulation adapter (AEA) *(continued)*
 - online tests 2-237
 - port driver/receiver wrap test (FN 01) 2-130
 - protocol conversion 1-22
 - start/stop ports 1-22
 - wrap plug 1-47
 - wrap plug wiring 2-130
- Asynchronous Emulation Adapter feature 1-12
 - gateway, Ethernet 1-13
 - gateway, ISDN 1-13
 - gateway, LAN 1-13
 - gateway, Token-Ring Network 1-13
- Asynchronous Emulation Adapter online tests 2-237

B

- base hardware
 - 3174 hardware 1-5
 - configuration description 1-5
- bus/tag tailgate assembly removal/replacement 3-18

C

- cable errors, resetting (test) 2-185
- Cabling System, IBM
 - 3299 Model 1 A-2
 - 3299 Model 1X4 A-2
 - 3299 Model 2 A-2
 - 3299 Model 3 A-2
 - 3299 Model 32 A-3
 - 3299 Model 32T A-3
 - description A-2
- call accepted (SVC) (X.25) B-4
- call connected (SVC) (X.25) B-4
- call request (SVC) (X.25) B-4
- card plugging 3-7
- CCITT V.35 cable wrap test (three TEST/OPER switches) 2-119
- central site change management
 - central site library 1-39
 - data types 1-39
 - description 1-39
 - microcode release 1-39
 - NetView Distribution Manager 1-39
- Central Site Customizing 2-289
- central site library 1-39
- channel adapter
 - channel driver/receiver wrap test 2-123
 - description 1-22
 - description, Enterprise Systems Connection 1-22
 - SNA modes 1-22
 - support 1-22
- channel attachment 4-8
- channel driver/receiver wrap test 2-123
- channel interface switch 1-38

- channel interface switch and indicator test (FN 02) 2-128
- channel wrap blocks 1-47
- Check Cond indicator 1-37
- checking the terminal ready (S, 4, or 6) condition 2-292
- clear confirmation (SVC) (X.25) B-4
- clear indication (SVC) (X.25) B-4
- Clear push button 1-38
- clear request (SVC) (X.25) B-4
- codes, status
 - 0000 through 0150 1-29
 - 1000 through 1099 1-30
 - 13xx 1-30
 - 2xx 1-29
 - 2xxx 1-30
 - 3xx 1-30
 - 3xxx 1-30
 - 4xx 1-30
 - 4xxx 1-30
 - 5xx 1-30
 - 5xxx 1-30
 - 6xx and 7xx 1-30
 - 7xxx 1-31
 - 8888 1-31
 - 8xx 1-30
- assignments 1-29
- display formats 1-26
- event log format 1-35
- examples 1-34
- general information 1-26
- hardware group numbers 1-21
- introduction 1-26
- multiple, operator-panel presentation 1-29
- operator panel format 1-34
- qualifiers 1-32
- single, operator panel presentation 1-29
- terminal presentation 1-29
- color convergence (test) 2-213
- COMM key (X.25) B-16
- communication adapter
 - CCITT V.35 cable wrap test (three TEST/OPER switches) 2-119
 - description 1-22, 1-24
 - function number descriptions 2-118
 - interface wrap (FN 01) 2-118
 - modem wrap test (FN 02) 2-118
 - optional tests 2-117
 - Type 1 B-2
 - Type 1 (HG 11) 1-22
 - Type 1 driver static test (FN 07) 2-118
 - Type 1 EIA 232D/CCITT V.35 2-118
 - Type 1 interface status test (FN 04) 2-118
 - Type 2 C-2
 - Type 2 (X.21) test 2-118
 - Type 2 interface clock test (FN 05) 2-118

- Communication Adapter function number
 - descriptions 2-118
- component locations 3-2
- composite error message description 2-320
- configuration menu, displaying (test) 2-172
- configurations
 - 3174 additional features 1-5
 - 3174 hardware 1-5
 - 3174 Model 21 optional features 1-5
 - base and feature hardware 1-5
 - FRU descriptions and functions 1-21
 - Terminal Adapter attachment 1-7
- connecting bus/tag channel cables 4-5
- control areas, display 2-198
- control blocks, displaying (test) 2-198
- Control diskette 1-36
- control extension 1-36
- controller channel priority 4-2
- convergence, color 2-213
- copy files Utility 2-289
- customize the Control disk 2-289
- customizing
 - channel attachment information 4-8
- CUT display exerciser (FN 04) 2-141

D

- data (PVC/SVC) (X.25) B-5
- data flow, 3174 1-19
- data link control function (X.21)
 - call ready (X.21) C-5
 - dialing (X.21) C-6
 - direct call (X.21) C-6
 - disconnection (X.21) C-7
 - incoming call in progress (X.21) C-6
 - local mode (X.21) C-6
 - outgoing call in progress (X.21) C-6
- Data Transfer indicator 1-37
- device status, 3270 2-175
- diagnostic (PVC/SVC) (X.25) B-5
- diagnostic aids
 - Asynchronous Emulation Adapter optional tests 2-130
 - channel driver, Enterprise Systems
 - Connection 2-128, 2-129
 - channel driver, send offline sequence test 2-129
 - channel driver/receiver wrap test 2-123
 - channel interface switch and indicator test (FN 02) 2-128
 - communication adapter optional tests 2-117
 - diagnostic (PVC/SVC) (X.25) B-5
 - diskette drive optional tests 2-108
 - displaying test monitor functions (terminal control) 2-152
 - Enterprise Systems Connection wrap test 2-128
 - hardware group basic tests 2-97, 2-106

- diagnostic aids (*continued*)
 - hardware group optional tests 2-98
 - hardware group test alls 2-96
 - loading the Test Monitor from a fixed disk 2-102
 - loading the Test Monitor from diskette 2-102
 - offline tests 2-96
 - online tests 2-154
 - operator panel test 2-116
 - running hardware group basic tests 2-106
 - running hardware group test alls 2-105
 - terminal adapter/TMA/3299 optional tests 2-139
 - test all 81 (CSU) 2-97
 - test all 82 (Alt 2 IML) 2-97
 - test all 87 2-97
 - test parameters 2-101
 - test request format 2-98
 - token-ring adapter tests 2-142
 - wrap test analysis 2-124
- Diagnostics 2-289
- dial mode screen (X.25)
 - CID (X.25) B-14
 - COPT (X.25) B-15
 - CUG (X.25) B-15
 - HNAD (X.25) B-14
 - HNAD default B-14
 - I/O (X.25) B-15
 - IOPT (X.25) B-15
 - NPKT (X.25) B-15
 - NWND (X.25) B-15
 - OOPT (X.25) B-15
 - RPOA (X.25) B-15
 - screen layout B-14
 - TCLS (X.25) B-15
- dial strings 2-297
- disconnecting the bus and tag cable 2-292
- diskette drives
 - fixed 1-22
 - media scan (FN 02) 2-109
 - optional tests 2-108
 - ready/change test 2-108
 - removal/replacement 3-16
- diskettes
 - 3174 dump diskette 1-37
 - characteristics 1-36
 - Control diskette 1-36
 - description 1-21
 - drive 1-21
 - DSL diskette 1-36
 - interfaces 1-22
 - limited function utility diskette 1-36
 - maximum RPQs 1-36
 - RPQ diskette 1-36
 - Utility diskette 1-36
- disks
 - extension 1-36

- display control areas 2-198
- display FRU ID table (FN 05) 2-153
- display hardware configuration (FN 04) 2-152
- display test log count/time IML drive (FN 07) 2-153
- display test log – IML drive (FN 02) 2-152
- display the Master Menu 2-288
- display vital product data 2-187
- displaying the test log 2-150
- displaying the test monitor functions (terminal control) 2-152
- DSL diskette 1-36
- dump procedure 2-310
- dump, test D distributed function terminal 2-247

E

- EIA/V.35 wrap plug 1-46
- Enter push button 1-38
- Enterprise Systems Connection Adapter 1-5
- Enterprise Systems Connection Wrap Test 2-128
- environmental classifications 1-44
- environmental restrictions
 - acoustics 1-44
 - gas 1-44
 - humidity 1-44
 - pollutants 1-44
 - shock 1-44
 - temperature 1-44
 - temperature and relative humidity 1-44
 - vibration 1-44
- error conditions 1-31
- error during dump, analyzing 2-312
- ESCON adapter online test 2-248
- ESCON Adapter test, how to run 2-128
- ESCON Adapter transmit/receive operation 2-295
- Ethernet adapter addressing 1-16
- Ethernet adapter HG 41 1-24
- event log
 - alerts 1-21
 - byte capacity 1-31
 - description 1-31
 - error conditions 1-31
 - event capacity 1-31
 - example 1-31
 - hardware group numbers 1-21
 - log records 1-31
 - microcode release 1-31
 - resetting 1-31
 - sample 1-31
 - status code format 1-35
 - status conditions 1-31
 - troubleshooting problems 1-31
- extended functions, checking (test) 2-213

F

- feature cards removal/replacement 3-7
- fiber optic terminal adapter (HG 26 and HG 27) 1-23
- field replaceable unit (FRU)
 - AEA (HG 21, 22, 23) 1-22
 - channel adapter HG 16 1-22
 - connection adapter, ESCON HG 17 1-22
 - descriptions and functions 1-21
 - diskette drives HG 01 or 02 1-21
 - Enterprise Systems Connection Adapter (HG 17) 1-22
 - Ethernet adapter HG 41 1-24
 - fiber optic terminal adapter (HG 26 and HG 27) 1-23
 - file adapter (HG 01) 1-22
 - fixed disk drive (HG 03) 1-22
 - hardware configuration table 1-25
 - hardware group number assignments 1-21
 - ISDN adapter HG 36–39 1-24
 - operator panel HG 09 1-22
 - operator panel module 1-25
 - planar board 1-24
 - problem determination 2-3
 - replacement strategy 2-3
 - storage card (1MB) HG 87 1-24
 - storage card (2MB) HG 87 1-24
 - storage card (4MB) HG 87 1-24
 - storage card (6MB) HG 87 1-24
 - telephone twisted-pair terminal multiplexer adapter (HG 26 and HG 27) 1-23
 - terminal adapter HG 26 and HG 27 1-23
 - terminal multiplexer adapter (HG 26 and HG 27) 1-23
 - Token-Ring adapter HG 31 1-23
 - Type 1 communication adapter HG 11 1-22
- field replaceable unit identification (FRU ID) 1-25
- fixed disk CSU surface scan test (FN 51) 2-114
- fixed disk drives
 - CSU surface scan test (FN 51) 2-114
 - defect fix test (FN 32) 2-110
 - description 1-22
 - display defect table (FN 34) 2-112
 - full format test (FN 33) 2-111
 - optional tests 2-110
 - removal replacement 3-17
 - storage capacity 1-22
 - surface scan test (FN 31) 2-110
 - write bootstrap loader test (FN 52) 2-114
- fixed disk surface scan test (FN 31) 2-110
- forcing the 3174 offline
 - Alt 1 method 2-291
 - warning 2-123
- frame relay online test 2-279
- FRU
 - See field replaceable unit (FRU)

- function number descriptions, terminal adapter 2-140
- function pushbuttons
 - Advance 1-38
 - Alt 1 1-38
 - Alt 2 1-38
 - Clear 1-38
 - description 1-38
 - Enter 1-38
 - IML 1-38
 - operator panel 1-38
- functions, extended 2-213

G

- gateway 1-15
- general description
 - 3174 data flow 1-19
 - 3174 Establishment Controller 1-19
 - 3174 Model 21 optional features 1-5
 - AEA 1-12
 - diskette drive 1-21
 - diskettes 1-36
 - event log 1-31
 - field replaceable unit identification (FRU ID) 1-25
 - file adapter 1-22
 - fixed disk drive 1-22
 - FRU descriptions and functions 1-21
 - hardware group numbers 1-21
 - non-SNA compatibility 1-5
 - operator panel 1-22
 - service strategy 1-4
 - SNA compatibility 1-5
 - status code assignments 1-29
 - status codes 1-26
 - Type 1 communication adapter HG 11 1-22
- general information
 - 3174 data flow 1-19
 - 3174 dump diskette 1-37
 - 3174 Establishment Controller 1-3
 - 3174 hardware 1-5
 - 3174 Model 21 optional features 1-5
 - 3174 models 1-5
 - AEA 1-12
 - Control diskette 1-36
 - diskettes 1-36
 - DSL diskette 1-36
 - event log 1-31
 - FRU descriptions and functions 1-21
 - FRU type numbers 1-21
 - general procedures 2-288
 - hardware 1-5
 - hardware group numbers 1-21
 - limited function utility diskette 1-36
 - non-SNA compatibility 1-5
 - operator panel 1-37
 - RPQ diskette 1-36

- general information (*continued*)
 - service strategy 1-4
 - SNA compatibility 1-5
 - status code assignments 1-29
 - status codes 1-26
 - Utility diskette 1-36
- general procedures
 - adding a patch 2-304
 - adding a Zap patch 2-307
 - analyzing a 3174 failure during dump 2-312
 - checking the terminal ready (S, 4, or 6)
 - condition 2-292
 - determining the token-ring adapter addresses 2-143
 - disconnecting the bus and tag cable 2-292
 - forcing the 3174 Model 21L, Alt 1 method 2-291
 - installation of a Model 21 on a channel 4-2
 - performing the 3174 dump procedure 2-310
 - placing the 3174 Model 21L online 2-290
 - placing the 3174 Model 22L online 2-291
 - powering off the 3174 Model 21L 2-292
 - powering on the 3174 Model 21L 2-292
 - processing an existing patch 2-309
 - starting the patch procedure 2-301
 - taking the 3174 Model 21L offline 2-290
 - taking the 3174 Model 22L offline 2-291
 - using the 3174 patch procedure 2-301

H

- hardware configuration
 - 3174 base hardware 1-5
 - additional features 1-5
 - FRU descriptions and functions 1-21
 - table 1-25
- hardware group
 - basic tests 2-97
 - loop parameter 2-101
 - optional tests 2-98
 - test alls 2-96
 - test parameters 2-101
- hardware group numbers
 - assignments 1-21
 - basic tests 2-97
 - description 1-21
 - optional tests 2-98
 - test all 81 (CSU) 2-97
 - test all 82 (ALT 2 IML) 2-97
 - test all 87 2-97
 - test request format 2-98
- Hayes Smart-Modem 1200
 - configuration switch settings 2-299
 - S Register settings 2-300
 - setup 2-299
 - specifications and switch settings 2-297
- HG01, file adapter 1-22

- HG03, fixed disk 1 1-22
- host communications
 - ASCII devices 1-22
 - channel adapter 1-22
 - EIA 232D connector 1-22
 - ESCON adapter 1-22
- how to display the master menu 2-288
- humidity
 - limits 1-44
 - range 1-44

I

- IBM 5821 and 5842
 - configuration switch settings 2-298
 - setup 2-298
 - specifications and switch settings 2-297
 - switch settings 2-298
- IBM Token-Ring Network
 - problems 1-4
- Identify Customizing Keyboard 2-290
- IML
 - Alt 1 normal description 1-41
 - Alt 1 normal procedure 1-41
 - Alt 2 1-43
 - description 1-41
 - hardware configuration table 1-25
 - normal 1-41
- IML push button 1-38
- incoming call (SVC) (X.25) B-4
- indicators B-7
 - Check Cond indicator 1-37
 - Data Transfer indicator 1-37
 - description 1-37
 - Offline indicator 1-37
 - Status indicators 1-37
- Initial Microcode Load (IML)
 - See IML
- initial symptom chart 2-3
- inspection
 - checking for unsafe conditions 5-2
 - checklist 5-3
 - general checklist guidelines 5-2
 - preparation 5-2
 - safety hazards 5-2
- installation
 - connecting bus/tag channel cables 4-5
 - controller channel priority 4-2
 - customizing parameters 4-8
 - description installing a Model 21 on a channel 4-2
 - priority switches 4-2
 - procedure installing a Model 21 on a channel 4-2
 - UCW settings 4-4
- interrupt levels 3-5
- ISDN adapter HG 36-39 1-24

- ISDN adapter tests menu 2-258
- ISDN gateway 1-13

J

- Japan NTT 2-118

K

- keypad
 - description 1-38
 - operator panel 1-38

L

- lamp test, how to perform 2-288
- LAN adapter addressing 1-16
- LAN adapter status summary, test 9, option 2 2-219
- LAN test menu 2-213
- LFU 1-36
- Limited Function Utility diskette 1-36
- link status summary, test 9, option 3 2-220
- link status summary, test 9, option 4 and 5 2-220
- LOCAL key (X.25) B-16
- logical channels (X.25) B-3
- logs menu, displaying (test) 2-166
- logs, resetting (test) 2-185
- loop 2-101

M

- maintenance analysis procedures
 - See MAPs (Maintenance Analysis Procedures)
- MAPs (Maintenance Analysis Procedures)
 - MAP 0100 Check Cond Ind Is On 2-5
 - MAP 0110 Operator Panel Isolation 2-7
 - MAP 0120 Status Code Not Indicated or Known 2-9
 - MAP 0200 3270-Type Terminal Problem Entry 2-10
 - MAP 0210 All 3270-Type Terminals are Failing 2-11
 - MAP 0220 One or more failing 3270-type terminals 2-16
 - MAP 0230 3299 Model 32 and the Fiber Optic Terminal Adapter 2-20
 - MAP 0300 Telecommunication Failures 2-26
 - MAP 0420 Status Code 8888 Displayed 2-30
 - MAP 0430 File Adapter or Drive Failures 2-32
 - MAP 0500 IML stops at 8888 2-34
 - MAP 0600 MMIO Bus Failure 2-35
 - MAP 0610 Token-Ring Failures 2-36
 - MAP 0620 ISDN Network Attachment Problems 2-39
 - MAP 0710 Power Load Isolation 2-47
 - MAP 0800 FRU ID Bus Isolation 2-49
 - MAP 0900 Channel Problems 2-51
 - MAP 0910 Online/Offline Channel Problem 2-52
 - MAP 0920 Local Channel 3174 Isolation 2-54

MAPs (Maintenance Analysis Procedures) *(continued)*
 MAP 0930 Enterprise Systems Connection Adapter Problems 2-58
 MAP 1000 ASCII Problem Entry 2-60
 MAP 1010 All ASCII Ports Are Failing 2-64
 MAP 1020 Direct Attached Port—Any Failure 2-66
 MAP 1030 Leased Line (Nonswitched) Port—Any Failure 2-73
 MAP 1040 Switched Line Port—Any Failure 2-80
 MAP 1050 3270 Type Terminal Failing to Communicate to an ASCII Host 2-94
 master menu 2-288
 master menu options 2-288
 Master Menu panel 2-288
 media management 2-290
 menu, LAN test 2-213
 menu, token-ring test 2-213
 Merge DSL code 2-289
 Micom 3012 and 3024
 configuration switch settings 2-300
 S1 and S2 switch group 2-300
 specifications and switch settings 2-297
 microcode
 control extension 1-36
 Microcode Upgrade 2-289
 modem
 specifications and switch settings 2-297
 modem specifications and switch settings 2-297
 Multi-Host Support 1-18
 multiple operational status codes 1-28
 multiplexer port wrap (FN 02) 2-141
 multiplexer wrap all (FN 06) 2-141

N

normal operating procedure (X.25)
 call ready (X.25) B-8
 cause and diagnostic indicators (X.25) B-7
 data ready (X.25) B-9
 disconnection (X.25) B-9
 exceptional case handling (X.25) B-10
 incoming call (X.25) B-10
 local mode (X.25) B-10
 X.25 SVC states and key operation B-11
 NTT Japan 2-118
 null modem wiring 2-137, 2-138

O

Offline indicator 1-37
 offline sequence test 2-129
 offline test status code presentation 1-29
 offline test status code presentation (terminal) 1-29
 offline tests
 channel driver/receiver wrap test 2-123
 communication adapter optional tests 2-117

offline tests *(continued)*
 diagnostic aids 2-96
 disk drive optional tests 2-110
 diskette drive media surface test 2-109
 diskette drive optional tests 2-108
 diskette drive ready/change test 2-108
 displaying the test log 2-150
 Enterprise Systems Connection wrap test 2-128
 hardware group basic tests 2-97, 2-106
 hardware group numbers 1-21
 hardware group optional tests 2-98
 hardware group test alls 2-96, 2-105
 operator panel test 2-116
 processor/storage tests 2-105
 setting and reading the timer 2-115
 terminal adapter/TMA/3299 optional tests 2-139
 terminal control test menus 2-103
 test all 81 (CSU) 2-97
 test all 82 (Alt 2 IML) 2-97
 test all 87 2-97
 test parameters 2-101
 test request format 2-98
 token-ring adapter tests 2-142
 offline, how to take the 3174 2-291
 OLT routines 2-319, 2-321
 online tests
 configuration B/C 2-154
 description 2-154
 test 0: terminal check 2-165
 test 1: display logs menu 2-166
 test 2: configuration menu 2-172
 test 3: 3270 device status information 2-175
 test 4: reset logs and cable errors 2-185
 test 5: display vital data 2-187
 test 6: display control blocks 2-198
 test 7: color convergence 2-213
 test 8: extended function and programmed symbols 2-213
 test 9: display the LAN test menu 2-213
 test 9: display the token-ring test menu 2-213
 test A: operator-originated alerts 2-246
 test D: distributed function terminal dump 2-247
 test menu shown on 3174 2-163
 test 10: port wrap tests 2-235
 test 11: trace control 2-236
 test 12: AEA tests 2-237
 test 13: ESCON adapter online test 2-248
 test 14: 3174 operator functions online test 2-253
 test 15: host status summary config b 2-256
 test 16: ISDN adapter tests 2-258
 test 17: APPN tests 2-268
 test 18: Frame Relay tests 2-279
 TCP/IP 2-242
 test menu 2-163

- online, how to place the 3174 2-291
- operation, transmit/receive 2-295
- operational status code presentation 1-27
- operator panel
 - Advance push button 1-38
 - Alt 1 push button 1-38
 - Alt 2 push button 1-38
 - Channel interface switch 1-38
 - Check Cond indicator 1-37
 - Clear push button 1-38
 - Data Transfer indicator 1-37
 - description 1-22, 1-37
 - Enter push button 1-38
 - fixed disk location 1-22
 - function push buttons 1-38
 - IML push button 1-38
 - indicators 1-37
 - keypad 1-38
 - location 1-22
 - multiple operational status codes 1-28
 - multiple-status code presentation 1-29
 - Offline indicator 1-37
 - operational status code presentation 1-27
 - running the operator panel test 2-116
 - scan defect table output 2-112
 - single operational status code 1-28
 - single-status code presentation 1-29
 - starting offline tests 2-96
 - status code format 1-34
 - status codes 1-21
 - Status indicators 1-37
- operator panel lamp test 2-288
- operator panel removal/replacement 3-14

P

- packet types (X.25) B-4
- parts catalog 6-1
- patch, adding 2-304
- patch, starting the procedure 2-301
- PC patch 2-301
- performing the 3174 dump procedure 2-310
- permanent virtual circuit (PVC) (X.25)
 - COMM key B-16
 - data (X.25) B-5
 - description B-16
 - diagnostic (PVC/SVC) B-5
 - LOCAL key B-16
 - PVC keys B-16
 - receiver not ready (X.25) B-5
 - receiver ready (X.25) B-5
 - reset confirmation (X.25) B-4
 - reset indication (X.25) B-4
 - reset request (X.25) B-4
 - restart confirmation (X.25) B-5
 - restart indication (X.25) B-5

- permanent virtual circuit (PVC) (X.25) *(continued)*
 - restart request (X.25) B-5
 - summary of states and indicators B-17
- pin assignments, AEA cabling 2-130
 - null modem 2-137, 2-138
 - to modem 2-135, 2-136
 - to terminal 2-130, 2-131, 2-132, 2-133, 2-134
- placing the 3174 Model 21L online 2-290
- placing the 3174 Model 22L online 2-291
- planar board 1-24
- planar removal/replacement 3-12
- port wrap function numbers 2-140
- port wrap tests 2-235
- power control
 - panels 1-39
- power supply
 - removal/replacement 3-11
- power switch, AC 1-39
- powering off the 3174 Model 21 2-292
- powering on the 3174 Model 21L 2-292
- printer exerciser test (FN 07) 2-141
- priority switches 4-2
- problem determination
 - See also* MAPs (Maintenance Analysis Procedures)
 - initial symptom chart 2-3
 - matching the symptom 2-3
 - strategy 1-4
 - wrap test analysis 2-124
- processing a patch 2-301
- programmed symbols, checking (test) 2-213
- PVC
 - See* permanent virtual circuit (PVC) (X.25)

R

- reading the timer (FN 01) 2-115
- receiver not ready (PVC/SVC) (X.25) B-5
- receiver ready (PVC/SVC) (X.25) B-5
- removal/replacement
 - bus/tag tailgate assembly 3-18
 - diskette drive 3-16
 - fan 3-14
 - feature cards 3-7
 - fixed disk drive 3-17
 - operator panel 3-14
 - planar 3-12
 - power supply 3-11
 - procedures 3-7
 - storage card 3-10
- repair
 - general information 3-2
 - strategy 1-4
- reset confirmation (PVC/SVC) (X.25) B-4
- reset indication (PVC/SVC) (X.25) B-4
- reset logs 2-185

- reset request (PVC) (X.25) B-4
- reset test log – IML Drive (FN 03) 2-152
- restart confirmation (PVC/SVC) (X.25) B-5
- restart indication (PVC/SVC) B-5
- restart request (PVC/SVC) (X.25) B-5
- restrictions
 - maximum AEAs 1-12
 - number of installed patches 2-301
- restrictions, environmental
 - acoustics 1-44
 - gas 1-44
 - humidity 1-44
 - pollutants 1-44
 - shock 1-44
 - temperature 1-44
 - temperature and relative humidity 1-44
 - vibration 1-44
- RPQ diskette 1-36
- running tests
 - Asynchronous Emulation Adapter optional tests 2-130
 - communication adapter optional tests 2-117
 - diskette drive optional tests 2-108
 - Enterprise Systems Connection Channel wrap test 2-129
 - fixed disk drive optional tests 2-110
 - hardware group basic tests 2-106
 - hardware group test alls 2-105
 - send offline sequence test 2-129
 - terminal adapter/TMA/3299 optional tests 2-139
 - the channel driver/receiver wrap test 2-123
 - token-ring adapter tests 2-142

S

- safety hazards 5-2
- service strategy 1-4
- setting the timer (FN 02) 2-115
- single operational status code 1-28
- special tools and tests
 - AEA 1-47
 - channel wrap blocks 1-47
 - description 1-45
 - EIA/V.35 wrap plug 1-46
 - Ethernet Adapter 10BASE-T wrap plug 1-46
 - Ethernet Adapter 10BASE2 wrap plug 1-46
 - Ethernet Adapter 10BASE5 wrap plug 1-46
 - ISDN Adapter wrap plug 1-47
 - token-ring adapter wrap plug 1-46
 - X.21 wrap plug 1-46
- status and key operation (X.21) C-7
- status codes
 - 0000 through 0150 1-29
 - 1000 through 1099 1-30
 - 13xx 1-30
 - 2xx 1-29

- status codes (*continued*)
 - 2xxx 1-30
 - 3xx 1-30
 - 3xxx 1-30
 - 4xx 1-30
 - 4xxx 1-30
 - 5xx 1-30
 - 5xxx 1-30
 - 6xx and 7xx 1-30
 - 7xxx 1-31
 - 8888 1-31
 - 8xx 1-30
- assignments 1-29
- display formats 1-26
- event log format 1-35
- examples 1-34
- general information 1-26
- hardware group numbers 1-21
- introduction 1-26
- multiple, operator-panel presentation 1-29
- operator panel format 1-34
- qualifiers 1-32
- single, operator panel presentation 1-29
- terminal presentation 1-29
- status indicators
 - Check Cond indicator 1-37
 - Data Transfer indicator 1-37
 - Offline indicator 1-37
 - output media 1-37
 - Status indicators 1-37
- stop on error 2-101
- storage card (1MB) HG 87 1-24
- storage card (2MB) HG 87 1-24
- storage card (4MB) HG 87 1-24
- storage card (6MB) HG 87 1-24
- storage card installation restrictions 3-7
- storage card removal/replacement 3-10
- summary of states and indicators (X.25) B-17
- support, multi-host 1-18
- SVC
 - See switched virtual circuit (SVC)
- switched virtual circuit (SVC)
 - call accepted (X.25) B-4
 - call connected (X.25) B-4
 - call request (X.25) B-4
 - clear confirmation (X.25) B-4
 - clear indication (X.25) B-4
 - clear request (X.25) B-4
 - data (X.25) B-5
 - description B-16
 - diagnostic (PVC/SVC) B-5
 - incoming call (X.25) B-4
 - receiver not ready (X.25) B-5
 - receiver ready (X.25) B-5
 - reset confirmation (X.25) B-4
 - reset indication (X.25) B-4

switched virtual circuit (SVC) *(continued)*
restart confirmation (X.25) B-5
restart indication (X.25) B-5
restart request (X.25) B-5
summary of states and indicators B-18
symbols, programmed 2-213

T

taking the 3174 Model 21L offline 2-290
taking the 3174 Model 22L offline 2-291
telephone twisted-pair terminal multiplexer adapter (HG 26 and HG 27) 1-23
temperature
limits 1-44
range 1-44
terminal adapter
attachment methods 1-7
configurations 1-7
CUT display exerciser (FN 04) 2-141
multiplexer port wrap (FN 02) 2-141
multiplexer wrap all (FN 06) 2-141
port wrap (FN 01) 2-140
printer exerciser test (FN 07) 2-141
terminal path test (FN 03) 2-141
wrap all (FN 05) 2-141
terminal adapter function number descriptions 2-140
terminal adapter HG 26 and HG 27 1-23
terminal control 2-101
terminal control test menus 2-103
terminal multiplexer adapter (HG 26 and HG 27) 1-23
test 13, option 1 2-249
test 87 2-97
test all 81 (CSU) 2-97
test all 82 (Alt 2 IML) 2-97
test all 87 2-97
test log
display count/time (FN 06) 2-151
display test log (FN 01) 2-151
displaying 2-150
function number descriptions 2-151
test menu, Advanced Peer-to-Peer Networking 2-268
test menu, frame relay 2-279
test menu, ISDN adapter tests 2-258
test menu, LAN 2-213
test menu, token-ring 2-213
Test Monitor
loading from a diskette 2-102
loading from a fixed disk 2-102
Utility microcode 2-102
test monitor function number descriptions 2-152
test monitor functions (terminal control),
displaying 2-152
test parameters
loop 2-101
request qualifiers 2-101

test parameters *(continued)*
stop on error 2-101
terminal control 2-101
test request format 2-98
test request format 2-98
test, alerts 2-246
test, dump 2-247
test, lamp 2-288
test, offline sequence 2-129
tests
offline 2-96
online 2-154
tests, port wrap 2-235
tests, running
Asynchronous Emulation Adapter optional
tests 2-130
communication adapter optional tests 2-117
diskette drive optional tests 2-108
Enterprise Systems Connection Channel wrap
test 2-129
fixed disk drive optional tests 2-110
hardware group basic tests 2-106
hardware group test alls 2-105
send offline sequence test 2-129
terminal adapter/TMA/3299 optional tests 2-139
the channel driver/receiver wrap test 2-123
token-ring adapter tests 2-142
timer, setting and reading 2-115
timers B-3
Token-Ring Adapter
adapter wrap test (FN 02) 2-143
addresses 1-16
cable wrap test (FN 01) 2-143
description 1-23
display universal address (FN 10) 2-143
function numbers 2-143
locally administered address 2-143
locally administered addresses 1-17
optional tests 2-142, 2-143
replacement considerations 2-143
universally administered address 2-143
universally administered addresses 1-16
wrap plug 1-46
token-ring adapter addressing 1-16
Token-Ring Gateway feature
token-ring test menu 2-213
tools 1-45
trace control (test) 2-236
transmit/receive operation 2-295
Type 1 communication adapter HG 11 1-22
type number assignments, FRU 1-21
type numbers 1-21

U

UCW settings 4-4
using the 3174 patch procedure 2-301
Utility diskette 1-36
Utility microcode 2-102

V

virtual circuits (X.25) B-3
vital data, displaying (test) 2-187
vital product data, display 2-187
voltage check 2-293

W

WARNING
detaching the token-ring adapter 2-142
processor channel state 4-5
switching off power 2-4
taking the 3174 offline 2-123
wrap test (HG 31) Function (02) 2-37
write bootstrap loader test (FN 52) 2-114

X

X.21 feature
call collision C-5
call progress (CP) signals C-5
description C-2
function requests C-4
functional description C-2
requirements C-2
status and key operation C-7
switched microcode function C-4
X.21 wrap plug 1-46
X.25 feature
definition B-2
description B-2
dial mode screen B-14
link level B-2
logical link control B-2
packet level B-2
physical level B-2
timer values B-3
timers B-3
X.25 key functions B-6
X.25 network
call accepted (SVC) B-4
call connected (SVC) B-4
call request (SVC) B-4
clear confirmation (SVC) B-4
clear indication (SVC) B-4
clear request (SVC) B-4
data (PVC/SVC) B-5
description B-3
diagnostic (PVC/SVC) B-5

X.25 network (*continued*)
incoming call (SVC) B-4
logical channels B-3
packet types B-4
receiver not ready (PVC/SVC) B-5
receiver ready (PVC/SVC) B-5
reset confirmation (PVC/SVC) B-4
reset indication (PVC/SVC) B-4
reset request (PVC) B-4
restart confirmation (PVC/SVC) B-5
restart indication (PVC/SVC) B-5
restart request (PVC/SVC) B-5
virtual circuits B-3
X.25 states B-8

Z

Zap patch 2-301
zap patch, adding 2-307

TELL US WHAT YOU THINK!

We hope you find this publication useful, readable, and technically accurate, but only you can tell us!

Your comments and suggestions will help us improve our technical publications.

Please take a few minutes to let us know what you think by completing this form.

If you are in the U.S.A., you may mail this form postage free or FAX it to us at 1-800-253-3520. (Elsewhere, your local IBM branch office or representative will forward your comments or you may mail directly to the address below.)

Fold and Tape

Please do not staple

Fold and Tape



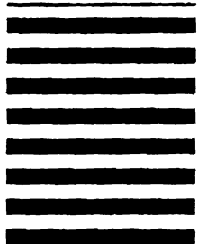
NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Department E02
Design & Information Development
International Business Machines Corporation
P O BOX 12195
RESEARCH TRIANGLE PARK NC 27709-9990



Fold and Tape

Please do not staple

Fold and Tape

FAX or MAIL 1-(800)-253-3520

TELL US

3174 Establishment Controller
Modles 21H, 21L, 21R, 22L, 22R,23R, and 24R
Maintenance Information
SY27-0323-05

Specific Problems and Comments:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Overall, I am satisfied with this publication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The information in this publication is technically accurate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The procedures in this publication are easy to follow.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This publication contains all the information I need.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific items of information are easy to find.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The figures and tables are easy to understand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The examples are helpful and useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The layout and format are attractive and useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What do you like most about this publication? _____

How can this publication be improved? _____

What similar publications, if any, do you think are better than this publication? (IBM or other) _____

For a Reply, Complete the Following—

Name _____	Company _____
Occupation _____	Address _____
Phone _____	_____
FAX _____	_____

Thank you for your response. When you send information to IBM, you grant IBM the right to use or distribute the information without incurring any obligation to you. You of course retain the right to use the information in any way you choose.



FAX or MAIL 1-(800)-253-3520



Part Number: 39F9541
File Number: 36/38/370/4300/8100/3174-09



Printed in U.S.A.



SY27-0323-05

