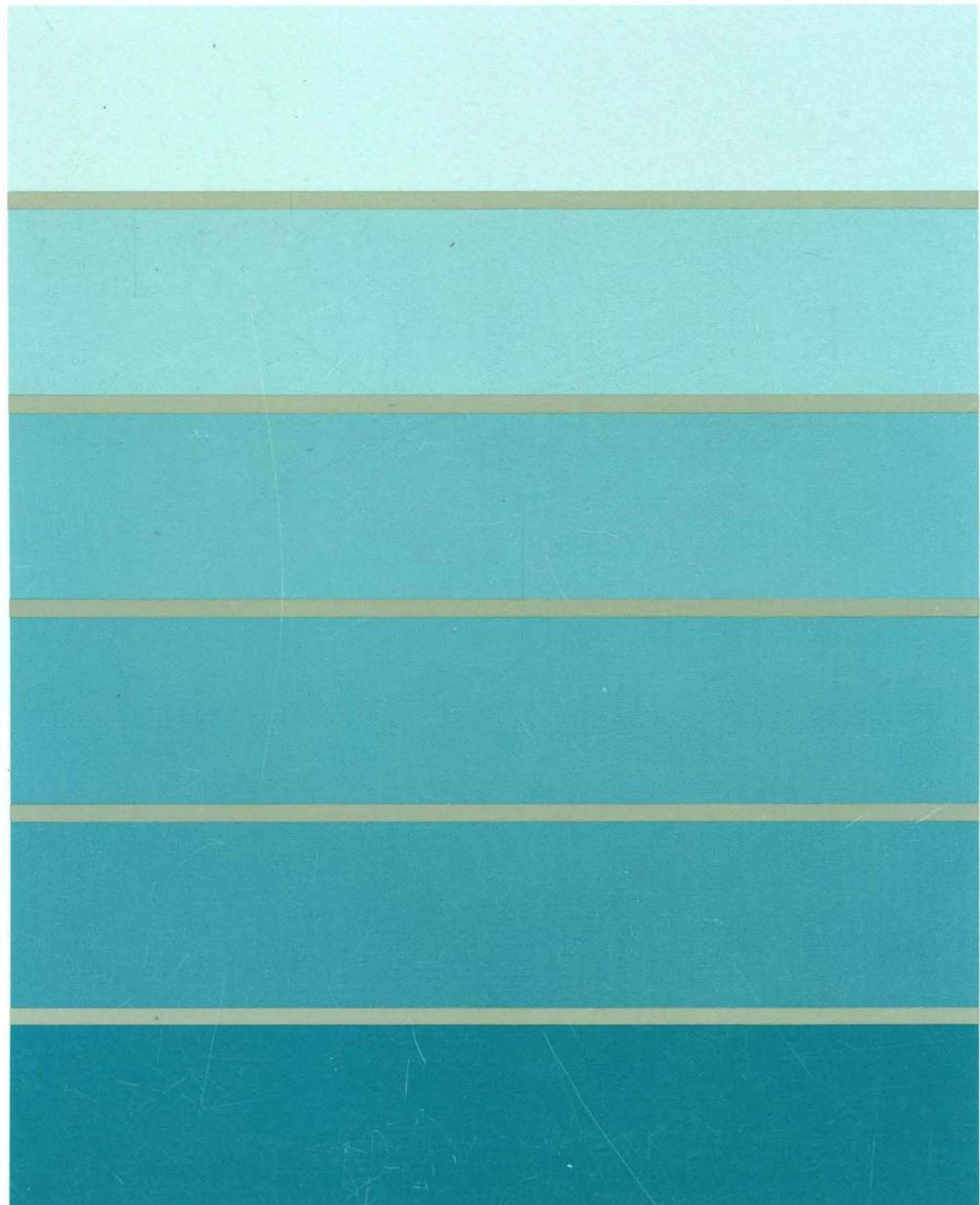




3174 Establishment Controller

SY27-2573-04

**Models 51R, 52R, 53R, 61R, 62R, and 63R
Maintenance Information**



3270 Information Display System



3174 Establishment Controller

SY27-2573-04

**Models 51R, 52R, 53R, 61R, 62R, and 63R
Maintenance Information**

)

Fifth Edition (May 1989)

This major revision obsoletes and replaces SY27-2573-3. See "Summary of Changes" on page xxi for the changes made to this manual. Changes or additions to text and illustrations are indicated by a vertical line to the left of the change.

The drawings and specifications contained herein shall not be reproduced in whole or in part without written permission.

IBM has prepared this maintenance manual for the use of IBM Service representatives in the maintenance or repair of the specific machines indicated. IBM makes no representations that it is suitable for any other purpose.

Information contained in this manual is subject to change from time to time. Any such change will be reported in subsequent revisions.

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 licensed program in this publication is not intended to state or imply that only IBM's licensed program may be used. Any functionally equivalent program may be used instead.

Requests for IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form for reader's comments is provided at the back of this publication. If the form has been removed, address comments to IBM Corporation, Department E02, P.O. Box 12195, Research Triangle Park, N.C., U.S.A. 27709-9990. IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

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

United States

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

Additional IBM Statement

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

Instructions to User:

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

United Kingdom

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

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

Canadian Department of Communications compliance statement

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

Avis de conformité aux normes du ministère des Communications du Canada

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

Choosing the Right Book from the 3174 Library

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

To Organize Library Materials:

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

To Become Familiar with the 3174:

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

To Prepare Your Site for the 3174:

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

To Set Up and Operate the 3174:

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

To Plan for and Customize the 3174:

Configuration Support A and S

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

Configuration Support B

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

To Install Features or Convert Models on the 3174:

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

To Plan for and Use the Asynchronous Emulation Adapter Feature:

Planning Guide, GA27-3844 or GA27-3862

Utilities Guide, GA27-3853 or GA27-3863

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

To Use the Multiple Logical Terminals Function:

Planning Guide, GA27-3844 or GA27-3862

Utilities Guide, GA27-3853 or GA27-3863

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

To Perform Problem Determination:

Customer Problem Determination, GA23-0217

Status Codes, GA27-3832

To Obtain Data Stream Programming and Reference Information:

Functional Description, GA23-0218

Data Stream Programmer's Reference, GA23-0059

3174 Character Set Reference, GA27-3831

3270 Character Set Reference, GA27-2837

3270 X.25 Operation, GA23-0204

To Perform Maintenance (Service Personnel):

Models 1L, 1R, 2R, 3R, 11L, 11R, 12R, and 13R Maintenance Information, SY27-2572

Models 51R, 52R, 53R, 61R, 62R, and 63R Maintenance Information, SY27-2573

Models 81R, 82R, 91R, and 92R Maintenance Information, SY27-2584

To Find Translations of Safety Notices:

Safety Notices, GA27-3824

Preface

This manual identifies the tasks involved in maintaining the IBM 3174 Establishment Controller Models 51R, 52R, 53R, 61R, 62R, and 63R and provides the information needed to keep these controllers in, or to restore them to, good working order.

Who This Book Is For

This book is for the product-trained and support-trained IBM service representative who maintains the 3174 Establishment Controller Models 51R, 52R, 53R, 61R, 62R, and 63R.

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

3174 Operator

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

Product-Trained Service Representative

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

Support-Trained Service Representative and Area-Designated Specialist

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

How This Book Is Organized

This book has five chapters:

Chapter 1, General Information, describes the service representative's maintenance approach to 3174 problem analysis and repair. This chapter also contains examples of 3174 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, general procedures, and 370/OLTs. 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, Safety Inspection Guide, contains information to determine whether a machine can be placed on an IBM maintenance agreement.

Chapter 5, Parts Catalog, contains illustrations and part numbers for the 3174 Models 51R, 52R, 53R, 61R, 62R, and 63R.

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

Appendix B contains information about the X.25 feature.

Appendix C contains information about the X.21 feature.

Contents

Chapter 1. General Information	1-1
Introduction	1-3
Service Strategy	1-4
3174 Configurations	1-5
3174 Hardware Configurations	1-5
Base Hardware	1-5
Additional Hardware Features	1-6
3174 Terminal Adapter Attachment Configurations	1-7
Asynchronous Emulation Adapter Device Attachments	1-9
3174 General Description	1-10
3174 FRU Descriptions and Functions	1-10
Hardware Group Numbers	1-13
Type Numbers	1-14
Field Replaceable Unit Identification (FRU ID)	1-15
Status Codes	1-15
3174 Event Log	1-20
Diskettes	1-24
Operator Panel	1-25
Central Site Change Management	1-27
IBM Token-Ring Network Gateway Feature	1-29
Token-Ring Gateway Feature Microcode	1-30
IBM Token-Ring Network Operation	1-30
3174 Models 53R and 63R Attached to a Token-Ring Network	1-31
Multi-Host Support	1-31
Concurrent Communication Adapter	1-31
Single Link Multi-Host Support	1-31
Asynchronous Emulation Adapter Feature	1-32
Asynchronous Emulation Adapter Communication	1-32
Asynchronous Emulation Adapter (AEA) Hardware	1-34
Communication Links and Associated Hardware	1-35
Physical and Logical Paths	1-36
Logical Path	1-36
Connection Menu	1-37
Power Supply Description	1-40
Power Supply Problem Determination	1-40
Normal Initial Microcode Load (IML)	1-42
Alt 1 IML Operations	1-42
Alt 1 IML Procedures	1-42
Alt 1 Normal IML Description	1-44
Alt 1 Normal IML Procedure	1-44
Alt 2 IML Procedures (Test 82)	1-45
Procedure A — Test 82	1-45
Procedure B — Test 82	1-46
Environmental Restrictions	1-46
Environmental Classifications	1-46
3174 Temperature and Humidity Limits	1-46
3174 Acoustics	1-46
Special Tools and Test	1-47
EIA/V.35 Wrap Plug	1-47
X.21 Wrap Plug	1-47
V.35 Cable Wrap Plug	1-48
Token-Ring Adapter Wrap Plug	1-48

Asynchronous Emulation Adapter Wrap Plug	1-48
Chapter 2. Diagnostic Information	2-1
Introduction	2-5
Start	2-5
Initial Symptom Chart	2-5
MAP 0100: Check Condition Ind Is On with Blank Status	2-7
MAP 0110: Operator Panel Isolation	2-9
MAP 0120: Status Code Not Indicated or Known	2-12
MAP 0200: Terminal Device(s) Problem Entry	2-13
MAP 0210: Terminal Adapter Isolation	2-14
MAP 0220: Terminal Attachment Configuration Chart	2-16
MAP 0230: 3299 Model 2, 3 Isolation	2-17
MAP 0240: 3299 Model 1 Isolation	2-23
MAP 0250: Terminal(s) Device(s) Isolation	2-28
MAP 0300: Host Remote 3174 Isolation	2-30
MAP 0430: File Failures	2-34
MAP 0600: Token-Ring Network 3174 Isolation	2-36
MAP 0700: DC Indicator Is Off	2-39
MAP 0710: Power Load Isolation	2-41
MAP 1000: ASCII Problem Entry	2-43
MAP 1010: All ASCII Ports Are Failing	2-47
MAP 1020: Direct Connection Port—Any Failure	2-49
MAP 1030: Nonswitched Connection Port—Any Failure	2-56
MAP 1040: Switched Connect Ports—Any Failure	2-64
MAP 1050: 3278 (or Equivalent) Terminal Failing to Communicate to ASCII Host	2-78
Diagnostic Aids: Offline Tests	2-80
Hardware Group Test Alls and Processor/Storage Tests	2-80
Hardware Group Basic Tests	2-81
Hardware Group Optional Tests	2-82
Test Request Format	2-82
Test Parameters	2-84
How to Load the Test Monitor	2-84
Loading the Test Monitor from Diskette Drive 1	2-84
Loading the Test Monitor from Diskette Drive 2	2-85
Loading the Test Monitor from Fixed Disk	2-85
Terminal Control Test Menus	2-86
How to Run Hardware Group Test Alls or Processor/Storage	2-88
How to Run Hardware Group Basic Tests	2-89
How to Run Diskette Drive Optional Tests	2-90
How to Run Fixed Disk Drive Optional Tests	2-91
Scan Defect Table Output	2-94
How to Read and Set the Timer	2-97
How to Run the Operator Panel Test	2-98
How to Run Communication and Concurrent Communication Adapter Optional Tests	2-99
How to Run Asynchronous Emulation Adapter Optional Tests	2-105
Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring	2-106
How to Run Terminal Adapter/Multiplexer Optional Tests	2-110
How to Run Token-Ring Adapter Optional Tests	2-113
How to Display the Test Log	2-116
How to Display the Test Monitor Functions (Terminal Control)	2-118
Diagnostic Aids: Online Tests	2-120
Online Tests Configuration A5/S5	2-120
Introduction	2-120
3174 Test Menu	2-123
Online Test Format	2-124

Test 0: Terminal Check	2-125
Test 1: Display Logs Menu	2-126
Test 2: Configuration Menu	2-132
Test 2, Option 1	2-133
Test 3: 3270 Device Status Information	2-134
Test 3, Option 1	2-135
Test 3, Option 2	2-137
Test 3, Option 3	2-138
Test 4: Reset Logs and Cable Errors	2-139
Test 5: Display Vital Data	2-140
Test 5, Option 1	2-141
Test 5, Option 2	2-142
Test 6: Display Control Blocks	2-143
Test 6, Option 2	2-144
Test 6, Option 3	2-151
Test 7: Color Convergence	2-155
Test 8: Extended Functions and Programmed Symbols	2-155
Test 9: Display the Token-Ring Test Menu	2-156
Test 9, Option 1	2-157
Test 9, Option 2	2-158
Test 9, Option 4	2-160
Test 9, Option 8	2-164
Test 10: Port Wrap Tests	2-166
Test 11: Trace Control	2-167
Trace Control Mode	2-167
How to Use the Trace Facility	2-167
How to Start a Foreground Trace	2-168
How to Start a Background Trace	2-169
Test 12: Asynchronous Emulation Adapter Tests	2-170
Test 12, Option 1	2-171
Test 12, Option 2	2-174
Test 12, Option 4	2-176
Test 12, Option 5	2-177
Test A: Operator-Originated Alerts	2-178
Test D: Distributed Function Terminal Dump	2-180
Online Tests Configuration B	2-181
Introduction	2-181
3174 Test Menu Configuration B	2-184
Online Test Format	2-185
Test 0 Configuration B: Terminal Check	2-186
Test 1 Configuration B: Display Logs Menu	2-187
Test 2 Configuration B: Configuration Menu	2-193
Test 2, Option 1	2-194
Test 3 Configuration B: 3270 Device Status Information	2-195
Test 3, Option 1	2-196
Test 3, Option 2	2-198
Test 3, Option 3	2-198
Test 3, Option 4	2-199
Test 4 Configuration B: Reset Logs and Cable Errors	2-201
Test 5 Configuration B: Display Vital Data	2-202
Test 5, Option 1	2-203
Test 5, Option 2	2-204
Test 6 Configuration B: Display Control Blocks	2-205
Test 6, Option 2	2-206
Test 6, Option 3	2-213
Test 7 Configuration B: Color Convergence	2-217

Test 8 Configuration B: Extended Functions and Programmed Symbols	2-217
Test 9 Configuration B: Display the Token-Ring Test Menu	2-218
Test 9, Option 1	2-219
Test 9, Option 2	2-220
Test 9, Option 4	2-222
Test 9, Option 8	2-226
Test 10 Configuration B: Port Wrap Tests	2-228
Test 11 Configuration B: Trace Control	2-229
Trace Control Mode	2-229
How to Use the Trace Facility	2-229
How to Start a Foreground Trace	2-230
How to Start a Background Trace	2-231
Test 12 Configuration B: Asynchronous Emulation Adapter Tests	2-232
Test 12, Option 1	2-233
Test 12, Option 2	2-235
Test 12, Option 4	2-237
Test 12, Option 5	2-238
Test A Configuration B: Operator-Originated Alerts	2-239
Test D Configuration B: Distributed Function Terminal Dump	2-241
General Procedures	2-242
How to Display the Master Menu	2-242
How to Perform the Coaxial Cable Ground Loop Check	2-245
How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)	2-247
How to Perform an Operator Panel Lamp Test	2-247
Modem Specifications and Switch Settings	2-247
Modems	2-247
IBM 5841 and 5842 Setup	2-248
Hayes SmartModem 1200 Setup	2-249
Micom Data Modems	2-250
How to Use the 3174 Patch Procedure	2-250
How to Use the 3174 Dump Procedure	2-260
How to Analyze a 3174 Dump Failure	2-261
3174 Models 51R, 52R, 61R, and 62R Controller OLTs	2-262
Applicable Executive Control Program	2-262
Chapter 3. Repair Information	3-1
Introduction	3-2
Microcode Level Support	3-2
Type Numbers and Hardware Group	3-5
Removal/Replacement Procedures	3-6
Feature Card Removal	3-6
Feature Card Replacement	3-6
Storage Card Removal Models 61R, 62R, and 63R	3-7
Asynchronous Emulation Adapter I/O Panel and Cable Removal/Replacement	3-8
Token-Ring Adapter Card Removal	3-9
Power Supply Removal/Replacement	3-10
Operator Panel Removal/Replacement	3-11
Diskette Drive 2 Removal/Replacement	3-12
Diskette Drive 1 Removal/Replacement	3-13
Fixed Disk Removal/Replacement	3-14
Fan F1 Removal/Replacement	3-16
Fan F2 Removal/Replacement	3-17
AC Line Filter Removal/Replacement	3-18
Planar Board Removal	3-19
Planar Board Replacement	3-21

Chapter 4. Safety Inspection Guide	4-1
Introduction	4-2
Preparation	4-2
General Checklist Guidelines	4-2
 Chapter 5. Parts Catalog	 5-1
 Appendix A. IBM Cabling System	 A-1
3299 Terminal Multiplexer Reference Information	A-3
3299 Model 1	A-3
3299 Model 2	A-3
3299 Model 3	A-3
Device Signal Cable Media Connectors	A-6
 Appendix B. X.25 Feature	 B-1
X.25 Elements	B-3
Physical Level	B-3
Link Level	B-3
Packet Level	B-3
Timers	B-4
X.25 Network	B-4
Virtual Circuits	B-4
Logical Channels	B-4
Packet Types	B-4
Call Request (SVC)	B-5
Incoming Call (SVC)	B-5
Call Accepted (SVC)	B-5
Call Connected (SVC)	B-5
Clear Request (SVC)	B-5
Clear Indication (SVC)	B-5
Clear Confirmation (SVC)	B-5
Reset Request (PVC)	B-5
Reset Indication (PVC/SVC)	B-6
Reset Confirmation (PVC/SVC)	B-6
Restart Request (PVC/SVC)	B-6
Restart Indication (PVC/SVC)	B-6
Restart Confirmation (PVC/SVC)	B-6
Data (PVC/SVC)	B-6
Receiver Not Ready (PVC/SVC)	B-6
Receiver Ready (PVC/SVC)	B-6
Diagnostic (PVC/SVC)	B-7
Switched Virtual Circuit (SVC)	B-7
Key Functions	B-7
X.25 States	B-8
Normal Operating Procedure	B-8
Call Ready (SVC only)	B-9
Data Ready	B-10
Disconnection (SVC)	B-10
Cause and Diagnostic Indicators	B-11
Incoming Call	B-11
Local Mode	B-11
Exceptional Case Handling	B-11
X.25 SVC States and Key Operation	B-12
Indicators	B-15
Call Ready	B-15
Dial In	B-15

Outgoing Call in Progress	B-15
Incoming Call in Progress	B-15
Data Ready (In Use)	B-16
Disconnect in Progress	B-16
Local	B-16
X.25 Communication Reminder Indicator	B-16
Extension Key	B-17
Extension Mode	B-17
Extension Key and X.25 Function Keys	B-19
Dial Mode Screen	B-19
Permanent Virtual Circuit (PVC)	B-22
PVC Indicators	B-22
PVC Keys	B-22
LOCAL Key	B-22
COMM Key	B-22
Summary of States and Indicators	B-23
Primary Virtual Circuit	B-23
Switched Virtual Circuit	B-24
X.25 Cause and Diagnostic Codes	B-24
Cause Codes	B-24
Diagnostic Code Modifiers	B-26
Diagnostic Codes from DCE	B-27
Diagnostic Codes from DTE	B-28
Appendix C. X.21 Feature	C-1
X.21 Functional Description	C-2
X.21 Switched Microcode Function	C-3
Data Link Control Function	C-5
Status and Key Operation	C-7
Call Progress Signal Code	C-9
X.21 Error Completion Modifier Bits	C-10
List of Abbreviations	X-1
Glossary	X-5
Index	X-19

Figures

1-1.	3174 Service Strategy	1-4
1-2.	Block Diagram of Terminal-Adapter-Attached Terminals	1-7
1-3.	Example of Terminal Attachment	1-8
1-4.	Asynchronous Emulation Adapter Device Attachments	1-9
1-5.	Hardware Configuration Table (example)	1-15
1-5.	Hardware Configuration Table Example	1-15
1-6.	Sample Event Log	1-21
1-7.	Data Stream Trace Example 1	1-22
1-8.	Data Stream Trace Example 2	1-23
1-9.	Log Records Example	1-24
1-10.	3174 Front Panel	1-26
1-11.	3174 Token-Ring Network Connection	1-29
1-12.	3270 Communication	1-32
1-13.	ASCII Communication	1-32
1-14.	3270 Terminal Communicating with an ASCII Host	1-33
1-15.	ASCII Terminal Communicating with an IBM Host	1-33
1-16.	ASCII Terminal Communicating with an ASCII Host	1-34
1-17.	Asynchronous Emulation Adapter Hardware	1-34
1-18.	AEA I/O Panel	1-35
1-19.	Communications Equipment	1-35
1-20.	Physical and Logical Paths	1-36
1-21.	Printer Logical Path	1-36
1-22.	Display Logical Path	1-37
1-23.	Connection Menu	1-37
1-24.	Connection Menu Option 1	1-38
1-25.	Connection Menu Option 2	1-38
1-26.	Host Set and Terminal Set	1-39
1-27.	Port Sets	1-39
1-28.	Connected Terminal and Port Sets	1-40
1-29.	Power Supply Plug P2	1-41
1-30.	EIA/V.35 Wrap Plug	1-47
1-31.	X.21 Wrap Plug	1-47
1-32.	V.35 Wrap Plug	1-48
1-33.	Token-Ring Adapter Wrap Plug	1-48
1-34.	Asynchronous Emulation Adapter Wrap Plug	1-48
2-1.	Port Status Worksheet	2-45
2-2.	Test Menu (example)	2-87
2-3.	Test Parameters Menu	2-87
2-4.	Selectable Functions Menu	2-88
2-5.	Display Scan Defect Table in Terminal Mode (Example).	2-95
2-6.	V.35 Three-Switch Test/Oper Switch	2-101
2-7.	EIA Communication Line Flow (Cable and Wrap Plug)	2-102
2-8.	X.21 Communication Line Flow, Switched and Nonswitched (Cable and Wrap Plug)	2-103
2-9.	V.35 Communication Line Flow (Cable and Wrap Plug)	2-104
2-10.	Switched and Nonswitched Line Modem Cable	2-106
2-11.	Direct Cable	2-107
2-12.	Direct Cabling Using a Null Modem	2-108
2-13.	Switched and Nonswitched Cable with Wrap Plug	2-109
2-14.	Block Diagram of Terminal Attachment	2-112
2-15.	Token-Ring Communication Line Flow (Cable and Wrap Plug)	2-115
2-16.	Test Log	2-117
2-17.	Hardware Configuration Table (Example)	2-119

2-18.	3174 Test Menu	2-123
2-19.	Test 0 Display Pattern	2-125
2-20.	Test 1 Menu	2-126
2-21.	Event Log Summary (Example)	2-127
2-22.	Log Record Display Panel	2-128
2-23.	RTM Log	2-130
2-24.	Test 2 Menu	2-132
2-25.	Hardware Configuration Table	2-133
2-26.	3270 Device Status Menu	2-134
2-27.	Status Summary	2-135
2-28.	Error Counters Example: Disabled Adapter and Disabled Port	2-137
2-29.	Connectivity Example: Enabled Adapter and Host Unconfigured	2-138
2-30.	Connectivity Example: Enabled Adapter and Live MLT Display	2-138
2-31.	Test 4 Menu	2-139
2-32.	Vital Data Menu	2-140
2-33.	Controller Vital Data	2-141
2-34.	Port Vital Data	2-142
2-35.	Test 6 Menu	2-143
2-36.	Port Control Area Panel	2-144
2-37.	LT Control Area Panel	2-145
2-38.	X.21 Short-Hold Mode Host Control Data	2-151
2-39.	X.25 Host Control Data	2-153
2-40.	Token-Ring Test Menu	2-156
2-41.	Token-Ring Status (Example showing messages that could occur)	2-157
2-42.	Token-Ring Adapter Status Summary	2-158
2-43.	Link Status Summary	2-160
2-44.	Gateway Host Status Summary	2-164
2-45.	Port Wrap – Test 10	2-166
2-46.	Test 12 Menu	2-170
2-47.	Asynchronous Emulation Adapter Port Tests Menu	2-171
2-48.	Test 12 Status Summary Panel	2-174
2-49.	AEA Error Counters Example: Disabled Adapter and Disabled Port	2-176
2-50.	Connectivity: Enabled Adapter and Display/Printer with an ASCII Host	2-177
2-51.	3174 Test Menu	2-184
2-52.	Test 0 Display Pattern	2-186
2-53.	Test 1 Menu	2-187
2-54.	Event Log Summary (Example)	2-188
2-55.	Log Record Display Panel	2-189
2-56.	RTM Log Configuration Support B	2-191
2-57.	Test 2 Menu	2-193
2-58.	Hardware Configuration Table	2-194
2-59.	3270 Device Status Menu	2-195
2-60.	Status Summary	2-196
2-61.	Error Counters Example: Disabled Adapter and Disabled Port	2-198
2-62.	Connectivity Example: Enabled Adapter and Host Unconfigured	2-198
2-63.	Connectivity Example: Enabled Adapter and Live MLT Display	2-199
2-64.	Status Summary	2-199
2-65.	Test 4 Menu	2-201
2-66.	Vital Data Menu	2-202
2-67.	Controller Vital Data	2-203
2-68.	Port Vital Data	2-204
2-69.	Test 6 Menu	2-205
2-70.	Port Control Area Panel	2-206
2-71.	LT Control Area Panel	2-207
2-72.	X.21 Short-Hold Mode Host Control Data	2-213
2-73.	X.25 Host Control Data	2-215

2-74.	Token-Ring Test Menu	2-218
2-75.	Token-Ring Status (Example showing messages that could occur)	2-219
2-76.	Token-Ring Adapter Status Summary	2-220
2-77.	Link Status Summary	2-222
2-78.	Gateway Host Status Summary	2-226
2-79.	Port Wrap – Test 10	2-228
2-80.	Test 12 Menu	2-232
2-81.	Asynchronous Emulation Adapter Port Tests Menu	2-233
2-82.	Test 12 Status Summary Panel	2-235
2-83.	AEA Error Counters Example: Disabled Adapter and Disabled Port	2-237
2-84.	Connectivity: Enabled Adapter and Display/Printer with an ASCII Host	2-238
2-85.	Alert Message panel	2-239
2-86.	Master Menu Configuration A5.0 and S5.0	2-242
2-87.	Master Menu Configuration B1.0	2-243
2-88.	Master Menu	2-251
2-89.	Patch Menu	2-252
2-90.	Diskette Drive Selection Menu	2-252
2-91.	Diskette Drive Selection Menu	2-253
2-92.	Patches Panel	2-254
2-93.	Patch Header Panel	2-255
2-94.	Patch Data Panel	2-255
2-95.	Relocatable Information Panel	2-256
2-96.	Call to Patch Area Panel	2-256
2-97.	Patches Panel (Adding a Zap Patch)	2-257
2-98.	Patch Header Panel (Adding a Zap Patch)	2-258
2-99.	Zap Patch Panel	2-258
2-100.	Patches Panel with One Patch Installed	2-259
3-1.	3174 Front Panel Locations	3-3
3-2.	3174 Back Panel Locations	3-3
3-3.	3174 Internal Locations	3-4
3-4.	Feature Card Removal	3-6
3-5.	Storage Card Removal Models 61R, 62R, and 63R	3-7
3-6.	Asynchronous Emulation Adapter I/O Panel and Cable	3-8
3-7.	Token-Ring Adapter Card Removal	3-9
3-8.	Power Supply Removal/Replacement	3-10
3-9.	Operator Panel Removal/Replacement	3-11
3-10.	Diskette Drive 2 Removal	3-12
3-11.	Diskette Drive 1 Removal	3-13
3-12.	Fixed Disk Removal	3-14
3-13.	Fan F1 Removal	3-16
3-14.	Fan F2 Removal	3-17
3-15.	AC Line Filter Removal/Replacement	3-18
3-16.	Planar Board Removal	3-20
3-17.	Planar Board Removal (Bezel Removed)	3-21
4-1.	3174 Safety Label Locations	4-4
A-1.	IBM Cabling System	A-2
A-2.	3299 Cabling	A-5
A-3.	BNC and DPC Connectors.	A-6
B-1.	Controller/Terminal Responses in Dial-In State	B-10
B-2.	Key Operations during X.25 States	B-12
B-3.	Extension Mode Definition	B-18
B-4.	Extension Key and X.25 Function Keys	B-19
B-5.	Dial Mode Screen	B-20
B-6.	PVC States and Indicators	B-23
B-7.	SVC States and Indicators	B-24
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	1-5
1-2.	Attachment Configurations	1-7
1-3.	Hardware Group Numbers	1-13
1-4.	Type Numbers	1-14
1-5.	DC Voltage Chart	1-41
1-6.	Alt 1 IML Selections	1-43
2-1.	Initial Symptom Chart	2-5
2-2.	Customizing Questions	2-54
2-3.	Port Test Parameters	2-55
2-4.	Customizing Questions	2-61
2-5.	Port Test Parameters	2-62
2-6.	Customizing Questions	2-71
2-7.	Port Test Parameters	2-71
2-8.	Function Numbers and Function Parameters	2-82
2-9.	Test Parameters	2-84
2-10.	Hardware Group Numbers (Basic Tests)	2-89
2-11.	Test Parameters	2-89
2-12.	Operator Panel Test	2-98
2-13.	Function Numbers (Communication)	2-99
2-14.	V.35 Test/Oper Switch Settings	2-101
2-15.	Function Numbers and Function Parameters (Port Wrap)	2-105
2-16.	Function Numbers and Function Parameters (Port Wrap)	2-111
2-17.	Token-Ring Adapter Function Numbers	2-113
2-18.	Test Log Function Numbers	2-116
2-19.	Test Monitor Function Numbers	2-118
2-20.	Hardware Group Numbers	2-129
2-21.	Port Control Area Bit Definitions	2-146
2-22.	LT Control Area Bit Definitions	2-148
2-23.	X.21 XID Summary	2-152
2-24.	WXYYZZ Override Settings	2-173
2-25.	Hardware Group Numbers	2-190
2-26.	Port Control Area Bit Definitions	2-208
2-27.	LT Control Area Bit Definitions	2-210
2-28.	X.21 XID Summary	2-214
2-29.	WXYYZZ Override Settings	2-235
2-30.	IBM 584x Modem Switch Settings	2-248
2-31.	Hayes SmartModem 1200 Configuration Switch Settings	2-249
2-32.	Hayes SmartModem 1200 S Register Settings	2-250
2-33.	3174 Models 51R, 52R, 53R, 61R, 62R, and 63R	2-262
3-1.	Features Supported by Microcode Support Level	3-2
3-2.	Type Numbers and Hardware Group	3-5
3-3.	Storage Card Plugging for Models 61R, 62R, and 63R.	3-7
A-1.	3299 Attached Terminal Cable Lengths	A-3
B-1.	X.25 Timer Values	B-4
B-2.	Cause Codes Received from DCE (Clear Packet)	B-25
B-3.	Cause Codes Received from DCE (Reset Packet)	B-25
B-4.	Cause Codes Received from a DCE (Restart Packet)	B-26
B-5.	Diagnostic Code Modifiers	B-26
B-6.	Diagnostic Code Fields Received from DCE	B-27
B-7.	Diagnostic Code Fields Generated by IBM (SNA) DTE	B-28
C-1.	Call Progress Signal Code	C-9
C-2.	X.21 Error Completion Modifier Bits	C-10

Summary of Changes

Fifth Edition (May 1989)

This revision of the *IBM Establishment Controller Models 51R, 52R, 53R, 61R, 62R, and 63R Maintenance Information* contains the following new information:

- The name of the 3174 was changed from Subsystem Control Unit to Establishment Controller. All references to control unit have been changed to controller.
- The title of this manual was changed to new include Models 61R, 62R, and 63R.
- Release A5, S5 and B1 microcode changes
- 2MB Base Storage
- 2.4MB diskette drives
- Multi-Host Support
- Concurrent Communication Adapter
- 16/4Mbps Token-Ring.

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

Chapter 1. General Information

Introduction	1-3
Service Strategy	1-4
3174 Configurations	1-5
3174 Hardware Configurations	1-5
Base Hardware	1-5
Additional Hardware Features	1-6
Host Communication Configurations	1-6
3174 Terminal Adapter Attachment Configurations	1-7
Asynchronous Emulation Adapter Device Attachments	1-9
3174 General Description	1-10
3174 FRU Descriptions and Functions	1-10
Planar Board	1-10
File Adapter HG 01	1-10
Diskette Drive HG 01 and HG 02	1-10
Fixed Disk Drive HG 03	1-10
Operator Panel HG 09	1-10
Type 1 Communication Adapter HG 11	1-11
Type 2 Communication Adapter HG 11	1-11
Asynchronous Emulation Adapter HG 21	1-11
Terminal Adapter (TA) HG 26	1-11
Token-Ring Adapter HG 31	1-12
Type 1 Concurrent Communication Adapter HG 51 and HG 52	1-12
Type 2 Concurrent Communication Adapter HG 51 and HG 52	1-12
Processor Card HG 87	1-12
Storage Card (512KB) HG 87	1-12
Storage Card (1MB) HG 87	1-12
Storage Card (2MB) HG 87	1-13
Hardware Group Numbers	1-13
Type Numbers	1-14
Field Replaceable Unit Identification (FRU ID)	1-15
Status Codes	1-15
Operational Status Code Operator Panel Presentation	1-16
Offline Test Status-Code Presentation	1-17
Status Code Assignments	1-18
3174 Event Log	1-20
Diskettes	1-24
Utility Diskette	1-25
Limited Function Utility Diskette	1-25
Control Diskette	1-25
DSL Diskette	1-25
RPQ Diskette	1-25
3174 Dump Diskette	1-25
Operator Panel	1-25
Indicators	1-26
AC Power Switch	1-26
Keypad	1-26
Function Pushbuttons	1-26
Central Site Change Management	1-27
IBM Token-Ring Network Gateway Feature	1-29
Token-Ring Gateway Feature Microcode	1-30
IBM Token-Ring Network Operation	1-30
Token-Ring Adapter Addressing	1-30

3174 Models 53R and 63R Attached to a Token-Ring Network	1-31
Multi-Host Support	1-31
Concurrent Communication Adapter	1-31
Single Link Multi-Host Support	1-31
Asynchronous Emulation Adapter Feature	1-32
Asynchronous Emulation Adapter Communication	1-32
Asynchronous Emulation Adapter (AEA) Hardware	1-34
Communication Links and Associated Hardware	1-35
Physical and Logical Paths	1-36
Logical Path	1-36
Connection Menu	1-37
Customizing	1-38
Power Supply Description	1-40
Power Supply Problem Determination	1-40
AC Indicator	1-40
DC Indicator	1-40
DC Voltage Test Points	1-41
Power Supply Voltage Chart	1-41
Normal Initial Microcode Load (IML)	1-42
Alt 1 IML Operations	1-42
Alt 1 IML Procedures	1-42
Alt 1 Normal IML Description	1-44
Alt 1 Normal IML Procedure	1-44
Alt 2 IML Procedures (Test 82)	1-45
Procedure A – Test 82	1-45
Procedure B – Test 82	1-46
Environmental Restrictions	1-46
Environmental Classifications	1-46
3174 Temperature and Humidity Limits	1-46
3174 Acoustics	1-46
Special Tools and Test	1-47
EIA/V.35 Wrap Plug	1-47
X.21 Wrap Plug	1-47
V.35 Cable Wrap Plug	1-48
Token-Ring Adapter Wrap Plug	1-48
Asynchronous Emulation Adapter Wrap Plug	1-48

Introduction

This chapter provides the following general information about the IBM 3174 Establishment Controller Models 51R, 52R, 53R, 61R, 62R, and 63R:

- Service strategy
- Configurations
- General Description
 - Field replaceable unit (FRU) descriptions
 - Hardware group numbers
 - Type numbers
 - FRU identification
 - 3174 event log description
 - Diskettes
 - Operator panel
- Token-Ring Network
- Asynchronous Emulation Adapter
- Power supply description
- Initial Microcode Load (IML)
 - Normal IML
 - Alt 1 IML
 - Alt 2 IML
- Environmental restrictions
- Special tools and testing.

Service Strategy

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

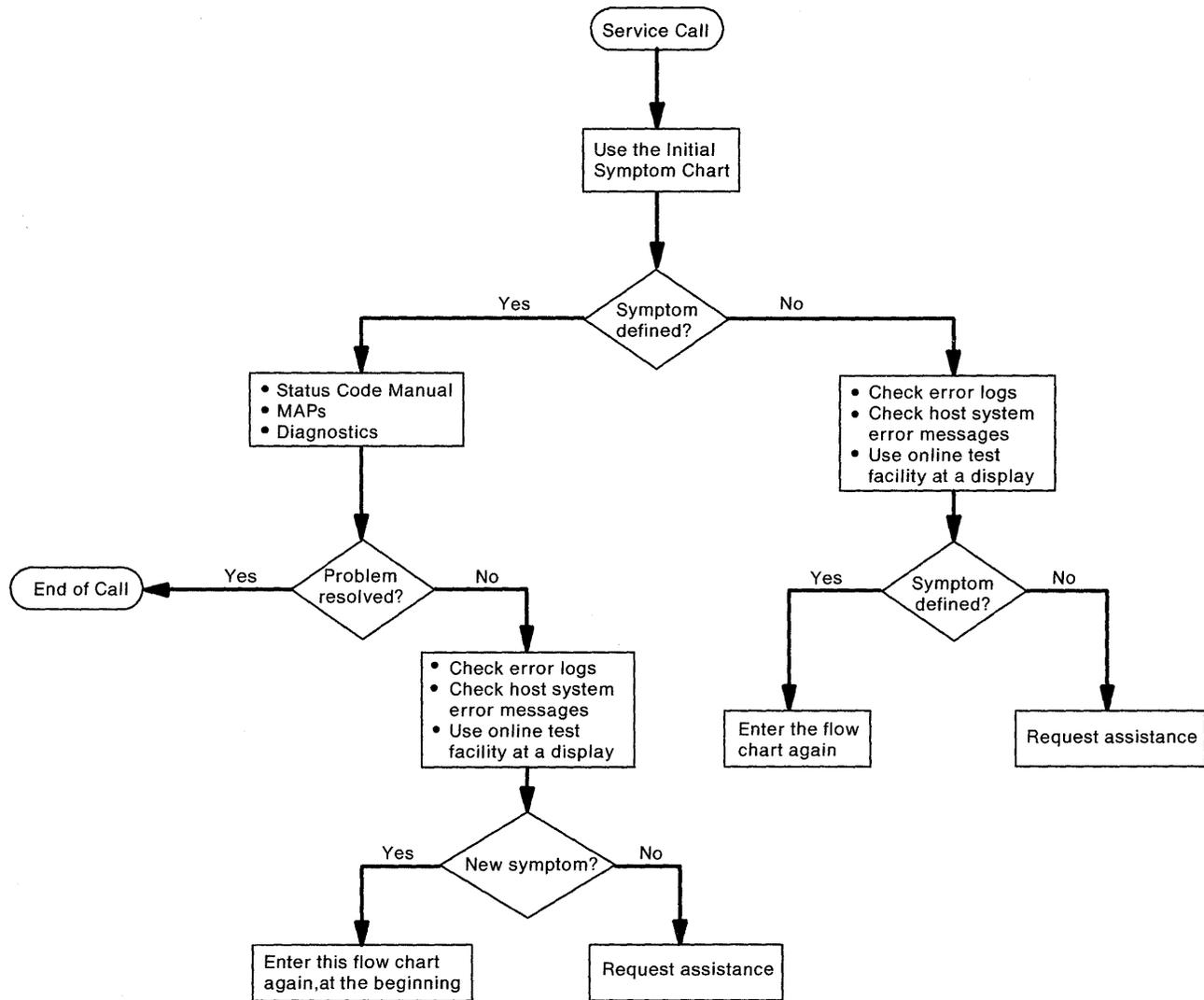


Figure 1-1. 3174 Service Strategy

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*, SY27-0280, and the *IBM Token-Ring Network Ring Diagnostic*. This diagnostic is controlled from an IBM Personal Computer or IBM Personal System/2™ that is attached to the ring.

Personal System/2 is a registered trademark of the International Business Machines Corporation.

3174 Configurations

This section contains information about 3174 Models 51R, 52R, 53R, 61R, 62R, and 63R base hardware, features, host communication configurations, and terminal attachment configurations.

3174 Hardware Configurations

Feature	Model 51R	Model 52R	Model 53R	Model 61R	Model 62R	Model 63R
Storage 512KB or 1MB	B	B	B	X	X	X
Storage 2MB	X	X	X	B	B	B
Diskette Drive 1	B	B	B	B	B	B
Diskette Drive 2	O	O	O	O	O	O
Fixed Disk Drive	O	O	O	O	O	O
Token-Ring Adapter	O	O	B	O	O	B
Asynchronous Emulation Adapter	O	O	X	O	O	O
512KB Storage Expansion	O	O	O	X	X	X
1MB Storage Expansion	O	O	O	O	O	O
2MB Storage Expansion	O	X	O	O	O	O
Type 1 Communication Adapter	B	X	X	B	X	X
Type 2 Communication Adapter	X	B	X	X	B	X
Type 1 Concurrent Communication Adapter	O	X	X	O	O	O
Type 2 Concurrent Communication Adapter	O	X	X	O	O	O

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

Base Hardware

Communication Adapter	Models 51R and 61R — Type 1 EIA/V.35 (BSC, SDLC, X.25) Models 52R and 62R — Type 2 X.21 (SDLC, X.25)
Terminal Adapter	Nine directly attached terminals, or up to 16 terminals through one or two 3299s (The 3299s attach through signal cable to the terminal adapter ports 0 and 8.)
Storage	Models 51R, 52R, and 53R — 1MB (one megabyte equals 1 048 576 bytes) (Either a 512KB planar board with a pluggable storage card installed or a 1MB planar board is installed.) Models 61R, 62R, and 63R — 2MB pluggable storage installed on the planar board. No storage cards can be installed in card positions 4 and 5.
Diskette Drive	Models 51R, 52R, and 53R—5.25-inch 1.2MB Models 61R, 62R, and 63R—5.25-inch 2.4MB (will read/write 1.2MB diskettes)

Additional Hardware Features

- One additional diskette drive or one fixed disk drive

Note: A second diskette drive or a fixed disk drive is required to support distributed function terminals that need a downstream load or the Asynchronous Emulation Adapter (AEA).

- A maximum of one Asynchronous Emulation Adapter (AEA) card. (Eight ASCII terminals, modems, or hosts attached to the AEA card.)
- One Token-Ring Adapter
- One IBM Token-Ring Network Gateway Feature
- One Concurrent Communication Adapter on Models 51R, 52R, and 63R.
- Two Concurrent Communication Adapters on Models 61R and 62R. This adapter allows communication with more than one 3270 host computer.
- Storage Feature 512KB (Models 51R, 52R, 53R only), 1MB, or 2MB.

Host Communication Configurations

The 3174 communicates with the host processors listed below using Synchronous Data Link Control (SDLC) or binary synchronous communication (BSC) over duplex or half-duplex communication facilities. The line control method the controller uses is set up during configuration. Details are available in the *3174 Planning Guide*.

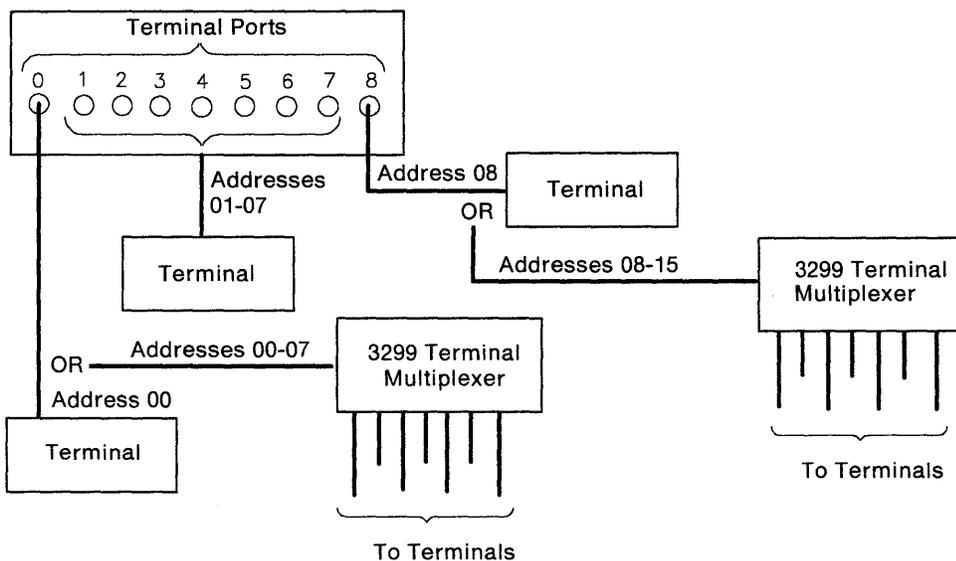
- System 36 (SDLC only)
- System 38 (SDLC only)
- 308x
- 3090
- 4361
- 4381
- 8100 (DPPX SNA)
- 9370
- AS400.

3174 Terminal Adapter Attachment Configurations

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

- Directly connected to a port on the planar board
- Connected to a 3299 terminal multiplexer.

See Figure 1-2.



Note: Ports 1 through 7 are disabled when a 3299 is attached to port 0.

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

Table 1-2 shows three terminal attachment configurations with the maximum number of terminals attached for each configuration. See Figure 1-3 for a typical terminal attachment configuration.

Table 1-2. Attachment Configurations			
Terminals Directly Attached	Terminals 3299 Attached	3299s Installed	Total Terminals Attached
9	0	0	9
8	8	1	16
0	16	2	16

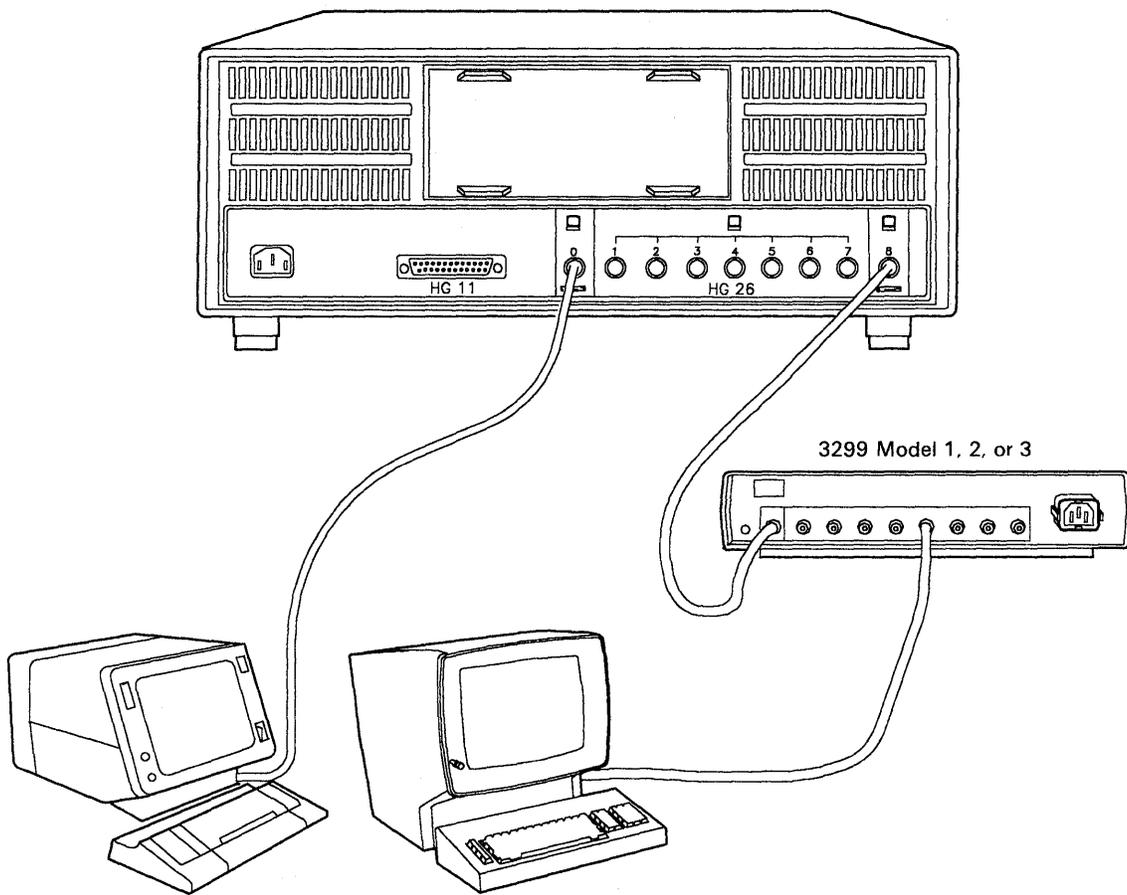


Figure 1-3. Example of Terminal Attachment

Figure 1-3 shows an example of the two ways terminals attach to the 3174 terminal adapter. This particular configuration allows a maximum of 16 terminals, where eight terminals attach directly to the planar board and eight terminals attach to the 3299 Terminal Multiplexer.

Notes:

1. When only one 3299 is attached to the controller, connect it to port 8 to allow 16-port capability.
2. Ports 1 through 7 are disabled when a 3299 is attached to port 0.

Asynchronous Emulation Adapter Device Attachments

The Asynchronous Emulation Adapter (AEA), with its input/output cable, provides eight 25-pin D-shell connectors for attachment to ASCII displays, printers, modems, or hosts. Figure 1-4 shows some possible device attachments to the Asynchronous Emulation Adapter.

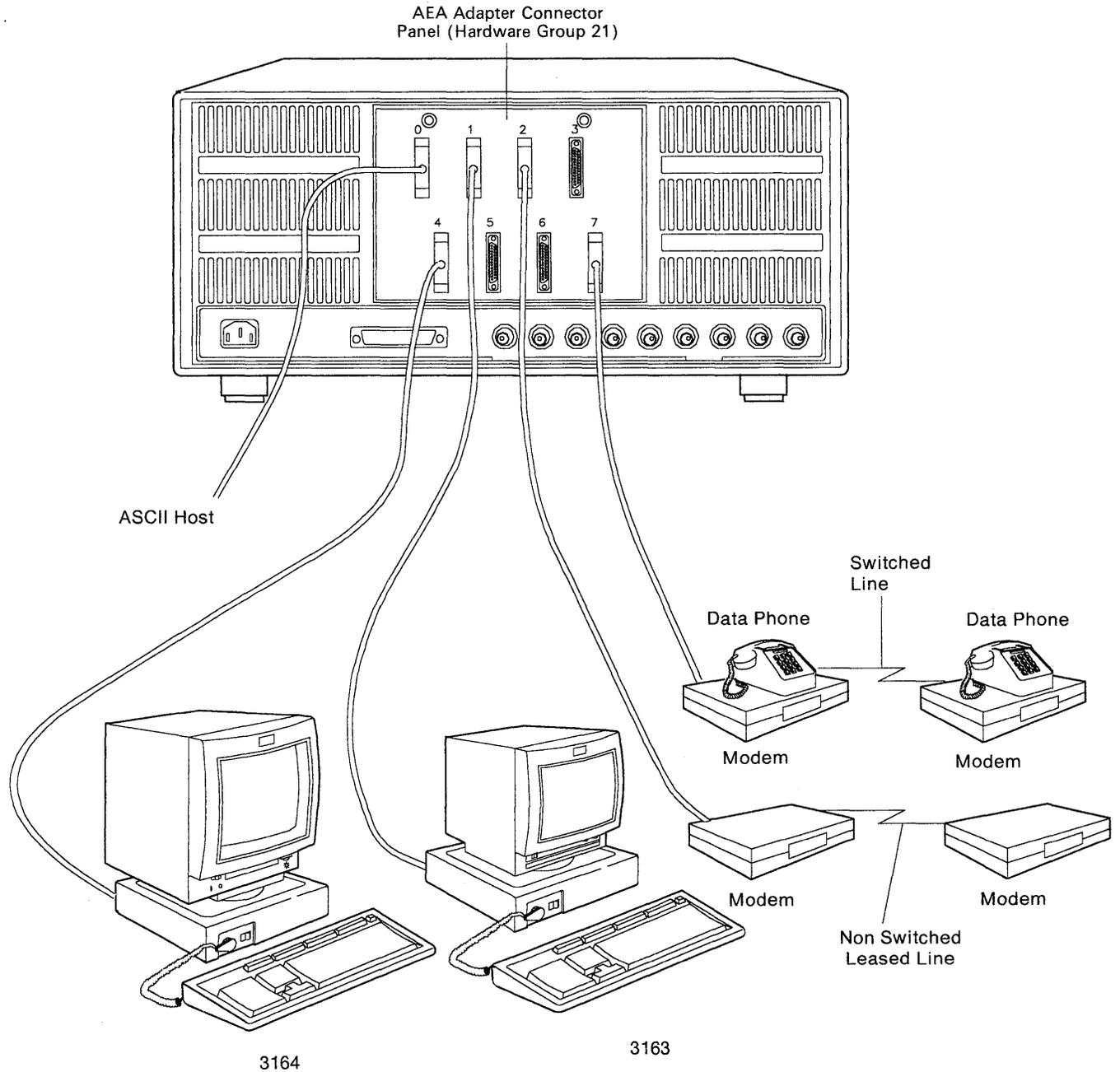


Figure 1-4. Asynchronous Emulation Adapter Device Attachments

3174 General Description

3174 FRU Descriptions and Functions

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

Planar Board

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

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

File Adapter HG 01

The file adapter provides read/write control for the two diskette drives and the fixed disk that can be installed in the controller. The file adapter interfaces with the PIO bus, the two diskette drives, the fixed disk drive, and the FRU ID bus.

Diskette Drive HG 01 and HG 02

The diskette drive uses a double-sided, soft-sectored (77 tracks per side), 5.25-inch removable diskette. Models 51R, 52R, and 53R are equipped with a 1.2MB drive. Models 61R, 62R, and 63R are equipped with a 2.4MB drive that will read and write on a 2.4MB diskette or a 1.2MB diskette. The diskette drive motor is +12 Vdc, direct drive (nonbelt). The +12 Vdc motor is hardware-controlled and is turned on only when drive access is required. The diskette drive is packaged in a manner that allows it to be easily removed from the controller. The drive(s) interfaces with the file adapter through a common bus. The drive(s) also interfaces with the FRU ID bus.

Fixed Disk Drive HG 03

The fixed disk is a direct access storage device. 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 in all controllers whether the fixed disk is installed or not. The fixed disk in its entirety is a field replaceable unit (FRU). The fixed disk drive interfaces with the FRU ID bus.

Note: The fixed disk drive is installed in the drive 2 position. Only one diskette drive is available when the fixed disk is installed.

Operator Panel HG 09

The operator panel contains the switches, indicators, and keypad shown in Figure 1-10 on page 1-26. The control logic for reading the keypad switches and writing data to the status indicators is contained on the planar board. The processor logic reads and writes to the operator panel through the PIO bus. The processor logic also interfaces with the operator panel adapter logic through the FRU ID bus.

Type 1 Communication Adapter HG 11

The Type 1 communication adapter provides CCITT (International Telegraph and Telephone Consultative Committee) V.24/V.28 (EIA 232D) and CCITT V.35 electrical interfaces to connect the controller to a modem or other signal converter. The Type 1 adapter is a base feature on the Models 51R and 61R. A 25-pin D-shell connector is provided on the planar board to allow connection of the communication interface cable. The adapter interfaces with the PIO bus and the FRU ID bus. The adapter logic works in PIO mode when BSC protocol is used, and in CHIO mode for other protocols. The desired interface, V.24/V.28 or V.35, and the operational speed are selected under microcode control. External clocking is required. The adapter logic has a FRU ID capability to sense that the correct interface cable is attached.

Type 2 Communication Adapter HG 11

The Type 2 communication adapter provides a CCITT V.11 (X.21) electrical interface to connect the controller to an X.21 network or other signal converter that provides a compatible interface. A 25-pin D-shell connector is provided on the planar board to connect the communication interface cable. The Type 2 adapter is a base feature on the Models 52R and 62R. The adapter interfaces with the PIO bus and the FRU ID bus. The adapter logic works in CHIO mode supporting SNA/SDLC protocols. The operational speed is selected under microcode control. External clocking is required. The adapter logic has FRU ID capability to sense that the correct interface cable is attached.

Asynchronous Emulation Adapter HG 21

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

Terminal Adapter (TA) HG 26

The terminal adapter provides buffering and control for attachment of a maximum of 16 display stations, printers, or workstations. The terminal adapter interfaces with the PIO bus and with the FRU ID bus. Each of the nine dual-purpose connectors (DPCs) provides a path to a single terminal. Port 0 and port 8 provide a path to eight terminals through a 3299 Terminal Multiplexer. Signals from port 0 and port 8 contain addressing for as many as eight terminals. Signals from ports 1 through 7 contain an address for one terminal. If a 3299 is connected to port 0 on the terminal adapter, ports 1 through 7 are disabled. The distance terminals or 3299s are located from the controller depends on the cable media being used and whether the particular terminal or 3299 requires a balun. See Table A-1 on page A-3.

Note: Terminals with the dual-purpose connector (DPC) have the driver/receiver circuitry that does not require the use of baluns. The DPC connector on these terminals accepts coaxial cable or IBM Cabling System Type 1 and Type 2 cables. A balun is an impedance matching device. It is required when cabling media other than coaxial cable is used to attach terminals such as 3278s to the controller. The balun matches the impedance of the cable being used to the impedance of the 3278 driver/receiver circuitry.

For more information about 3299 terminal multiplexers, see "3299 Terminal Multiplexer Reference Information" on page A-3.

Token-Ring Adapter HG 31

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

Type 1 Concurrent Communication Adapter HG 51 and HG 52

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

Type 2 Concurrent Communication Adapter HG 51 and HG 52

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

Processor Card HG 87

The processor card contains the controller microprocessor, a timer, a read-only storage (ROS) module, and other timing and control logic. It also contains logic for single-bit-per-halfword storage error correction and double-bit storage error detection. The processor logic interfaces with the PIO, MMIO, storage, and FRU ID buses. A red light-emitting diode (LED) on the planar 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 Card (512KB) HG 87

The 512KB storage logic consists of storage and switching logic that provides 524 288 bytes of usable storage, 6-bit error correction code, single-bit error correction, and double-bit error detection. The storage logic interfaces with the storage bus and the FRU ID bus. The 512KB card is available on Models 51R, 52R, and 53R only.

Storage Card (1MB) HG 87

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

Storage Card (2MB) HG 87

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

Hardware Group Numbers

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

- Hardware group numbers 01 through 52 are assigned to individual FRUs in the 3174 controller, such as logic and diskette drives.
- Hardware group number 80 is assigned to the test monitor program.
- Hardware group number 87 is assigned to the processor and storage logic on the planar board and the pluggable storage card.
- 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.

HG	Description	HG	Description
00	Invalid or unknown	26	Terminal Multiplexer Adapters
01	Diskette 1/File Adapter	31	Token-Ring Adapter
02	Diskette 2	51	Concurrent Communication Adapter
03	Fixed Disk	52	Concurrent Communication Adapter
08	Timer	80	Test Monitor
09	Operator Panel	81	Test All CSU Mode
11	Communication Adapter	82	Test All Installed Mode
21	Asynchronous Emulation Adapter	87	Processor/Storage
26	Terminal Adapters	99	Unassigned Hardware Group

Type Numbers

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

Table 1-4. Type Numbers		
Type	HG	FRU
0000		Invalid or Unknown
9000		Empty card location
9001		Invalid card/condition
9021		Planar Board 51R (EIA/V.35)(512KB)
9022		Planar Board 53R (1MB)
9025		Planar Board 51R (EIA/V.35)(1MB)
9051	87	512KB Storage Card
9052	87	1MB Storage Card
9053	87	2MB Storage Card
9111	01	Diskette 1 (base) 1.2MB Models 51R, 52R, and 53R
9112	02	Diskette 2 (feature) 1.2MB Models 51R, 52R, and 53R
9115	01	Diskette 1 (RPQ) 2.4MB Models 51R, 52R, and 53R
9116	02	Diskette 2 (feature) 2.4MB Models 51R, 52R, and 53R
9133	03	Fixed Disk Drive Models 51R, 52R, and 53R
9221		Planar Board 52R (X.21)(512KB)
9225		Planar Board 52R (X.21)(1MB)
9263	51,52	Type 1 Concurrent Communication Adapter (EIA/V.35)
9267	52,52	Type 2 Concurrent Communication Adapter (X.21)
933X	21	Asynchronous Emulation Adapter
9350	31	Token-Ring Adapter (4Mbps)
9351	31	Token-Ring Adapter (16/4Mbps)
9421	01,02	Diskette Drive 2.4MB Models 61R, 62R, and 63R
9431	03	Fixed Disk Drive 2.4MB Models 61R, 62R, and 63R
9422	02	Diskette Drive 1.2MB Models 61R, 62R, and 63R
9481	87	Storage 2MB
9482	87	Storage 2MB
9483	87	Storage 2MB
9485	87	Storage 1MB
9486	87	Storage 1MB
9487	87	Storage 1MB
9522	09	Operator Panel (Models 51R, 52R, 53R, 61R, 62R, and 63R)
9541	21	AEA Cable Assembly
9621		Planar Board EIA/V35 0MB
9622		Planar X21 0MB
9623		Planar Board Model 63R

Field Replaceable Unit Identification (FRU ID)

A FRU ID module is contained on each diskette (or fixed disk) drive, and several FRU ID modules are on the planar board to identify individual adapter logic, such as the communication adapter logic. During an IML, each module sends its FRU ID number to the processor logic. The FRU ID numbers are used to build the hardware configuration table, which is written on the Control disk. This occurs every time an IML is performed. The hardware configuration table, shown in Figure 1-5, can be displayed by using online test 2 (see "Test 2: Configuration Menu" on page 2-132) or the offline test monitor (see "How to Display the Test Monitor Functions (Terminal Control)" on page 2-118).

Hardware Configuration Table									
HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
00	9001	00	Invalid Card/Cond		09	9522	07	Ops Panel Assembly	
01	9111	01	Diskette 1 - 1.2MB	32XX	11	9025	03	Type 1 Com Adpt-XXX	
01	9025	03	File Adpt		21	933X	04	Asynch Emul Adpt	
03	9130	02	Fixed Disk - 20MB	32XX	87	9025	03	Storage 1MB	
08	9025	03	Timer		26	9025	03	Terminal Adpt	
09	9025	03	Ops Panel Adpt						

Select Test; press ENTER ==>_

PF: 3=Quit 12=Test Menu

HG = Hardware group
 TYPE = FRU type number
 LC = Location
 SC = Status code indicating an error on normal IML.

Note: This table shows a configuration for a 3174 Model 51R. The FRU type numbers may vary for different models of the 3174. Only those FRUs that are physically installed are displayed in this table. All the adapters that are listed with the same FRU type 9025 are contained on the planar board. The SC column in the table will contain a 32XX number only if a problem has occurred with a FRU during the IML. See the *IBM 3174 Status Codes* manual to identify what a particular status code means.

For the communication adapter, the XXX equals one of the following:

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

Figure 1-5. Hardware Configuration Table Example

Status Codes

Status codes indicate the following:

Controller failures Attached-device failures

General Description

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

Status codes are displayed in four formats:

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

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

Operational Status Code Operator Panel Presentation

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

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

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

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

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

The following codes are examples for this procedure:

```
381 0101 (QAHG) 9111 (B1B2) 0100 (B3B4)
3020 0101 (QAHG) 9111 (B1B2) 0100 (B3B4)
331 0211 (QAHG) 9025 (B1B2) 0300 (B3B4) 01 (B5)
```

1. When 381 is displayed, press Advance to stop scrolling.
2. Press Advance; 0101 is displayed.
3. Press Advance; 9111 is displayed.
4. Press Advance; 0100 is displayed.
5. Press Advance; four blanks are displayed.

6. Press Advance; four blanks are displayed.
7. Press Advance; 381 is displayed again.
8. Press Enter to resume automatic scrolling.

These steps can be repeated for each status code.

Offline Test Status-Code Presentation

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

Offline Test Status-Code Presentation (Terminal): On the terminal, any status code that occurs is displayed with all the additional fields, such as 3001 0XHG TYPE LOCA TYPE LOCA. If multiple status codes occur, they are displayed on the terminal in the format shown in the test log. (See Figure 1-6 on page 1-21 for an example of the test log.)

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

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

```
3001 0126 (QAHG) 9025 (TYPE) 0300 (LOCA) 9025 (TYPE) 0300 (LOCA)
```

1. At 3001, press Advance.
2. 0126 is displayed; press Advance.
3. 9025 is displayed; press Advance.
4. 0300 is displayed; press Advance.
5. 9025 is displayed; press Advance.
6. 0300 is displayed; press Advance.
7. Four blanks are displayed; press Advance.
8. Four blanks are displayed; press Advance.
9. 3001 is displayed.

The steps can be repeated to redisplay the additional fields.

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

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

The following codes are examples for this procedure:

```
3001 0111 (QAHG) 9025 (TYPE) 0300 (LOCA)
3001 0101 (QAHG) 9025 (TYPE) 0300 (LOCA)
```

General Description

1. 3001 is displayed on the operator panel.
2. Press Advance; 0111 is displayed.
3. Press Advance; 9025 is displayed.
4. Press Advance; 0300 is displayed.
5. Press Advance; four blanks are displayed.
6. Press Advance; 3001 is displayed.
7. Press Advance; 0101 is displayed.
8. Press Advance; 9025 is displayed.
9. Press Advance; 0300 is displayed.
10. Press Advance; four blanks are displayed.
11. Press Advance; four blanks are displayed.
12. Press Advance; the first 3001 status code is displayed.

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

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

For multiple status codes that appear at the operator panel during offline tests, it is recommended that these errors be displayed at the terminal connected to port 0. See "How to Display the Test Monitor Functions (Terminal Control)" on page 2-118.

Status Code Assignments

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

The status codes are assigned to the following categories.

0000 through 0150

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

2xx

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

3xx

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

4xx

This number range is used to indicate SNA protocol errors, data stream errors, and host software errors detected when the controller is operational. These numbers appear on terminal-adapter-attached 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 status code event log and are not displayed.

6xx and 7xx

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

8xx

This number range is used to indicate Token-Ring problems, ring station failures, and ring statistics, as well as problems with the Asynchronous Emulation Adapter and 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 status code event log and are not displayed.

1000 through 1099

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

13xx

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

2xxx

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

3xxx

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

General Description

4xxx

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

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

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

5xxx

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

7xxx

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

8888

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

3174 Event Log

The 3174 provides a nonvolatile event log which is recorded on the Control diskette or fixed disk that was used to IML the controller. Most error or status conditions are logged while the 3174 is online. Logging does not occur during offline procedures or tests. The log has a 15 000-byte capacity and accommodates 300 to 1400 events. It wraps when it is full, overlaying the oldest errors. The log is reset only by use of online test 4, option 2. Writing of log records occurs immediately for critical faults or when a buffer sector of 512 bytes has been filled. Figure 1-6 on page 1-21 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.

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

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

Also added to the event log panel are identifiers for the extended data bytes. They are labeled B1 – B16 to make it easier to correlate the data bytes to their descriptions in various other parts of this manual.

```

_____ Log Records - All _____

( Day/Time since last POR: 000/08:11 )
Day Time   SC   QA  PHG_PN  CHG_PN   LT  Extended data bytes (B1-B16)
           B1  B3  B5  B7  B9  B11  B13  B15
000 08:11  0331  51  11
           9025 0300 01
000 00:05  0384  05  99
           0387 0385
000 00:03  0500  01  11
000 00:02  0532  10  11
000 00:02  3174  01  00
015 21:48  0402  02  00_02  26_02   002 0000 0003 F350 0000
015 21:22  0401  03  00_06  26_06   006 0001 0004 3C40 4000
015 21:20  0209  51  26_08
           008
015 21:19  0201  51  26_08
           008
015 21:07  3174  01  00
015 20:01  0311  01  87
           9051 0500

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

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

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

```

Figure 1-6. Sample Event Log

In the example above, the Day/Time since 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 Day/Time 000/00:02. This particular IML was a power-on IML because the Day/Time has been reset to zeros (an IML takes about 2 minutes to complete). At Day/Time 015/21:07, another IML occurred. Note that the timer was not reset. This was not a power-on IML.

At time 00:02, a 532 10 (SC QA) occurred immediately after IML completion, indicating the communication adapter (HG 11) recognized that the communication link was idle. At time 00:03, the problem was cleared by host operator intervention and status code 500 01 was logged, indicating that status code 532 10 was deleted from the operator panel. Status code 500 is used to indicate that a condition for a particular hardware group has been cleared.

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

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

Note: Status code qualifiers (QA) above 50 indicate temporary conditions. 9025 in the extended data is the planar board type number, and 0300 indicates the planar board is in machine location 03. The 01 indicates the communication adapter on the planar is running on interrupt level 01.

In many cases it is necessary to determine the cause for a re-IML. This is usually the log record just before the 3174 IML status code. For example, if the 3174 at time 21:07 is an unplanned IML, the log record at time 20:01 may be the source of the problem. In the example, at time 20:01, status code 311 01 was logged for HG 87 (processor/storage). This indicates an unrecoverable storage failure occurred. In the extended data, 9051 is the card type number and 05 indicates the location of the storage card that failed.

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

The 3174 also attempts to pinpoint data stream errors by logging the condition and the details of the condition for use by the system programmer. In the example, at time 21:48, status code 402 02 occurred, indicating a data stream protocol problem was detected on the terminal attached to port 02. At the time of the event, port 02 was communicating with (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 2 bytes in the extended data indicate that the invalid address was found 3 bytes after the command in the data stream. The third set of 2 bytes shows the invalid data. F350 addresses buffer position 3280 for the attached terminal. The terminal should have Model 4 or Model 5 characteristics to support this address. A host SYSGEN or application program problem or a terminal setup problem should be suspected. A trace of the data stream is not necessary with the above information; but, if one were taken, it would look similar to the example shown in Figure 1-7.

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 1-7. 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 06 (while communicating with or connected to port 06 of hardware group 26), received a data stream from the host that contained an invalid command. The extended data gives further details about the error. Since the first 2 bytes of the extended data are not zero, the data stream was started with a Write Structured Field (WSF) command. The value 0001 indicates that the error occurred in the first structured field in the data stream. The data in error was found to be at a displacement of 4 bytes (0 origin) into the structured field containing the error, and the data was 3C40. The structured field type was 40, indicating an outbound 3270 data stream structured field. Byte 4 of the outbound 3270 data stream structured field must contain a valid 3270 Write or Copy command code. 3C is not a valid command code. An application program problem should be suspected. Given this information, a trace of the failing data stream should not be necessary; but, if one were taken, it would look similar to the example shown in Figure 1-8.

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 1-8. Data Stream Trace Example 2

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

Example 1: Operator Panel

331 0211 9025 0300 0100

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

Press Advance; 0211 is displayed.

Press Advance; 9025 is displayed.

Press Advance; 0300 is displayed.

Press Advance; 0100 is displayed.

331 = Status code

0211 = Status code qualifier (QA) and a hardware group number (HG)

9025 = The FRU Type number (TYPE)

03 = The location of the FRU (LOCA)

00 = Don't care

01 = The adapter interrupt level

00 = Don't care

Example 2: Event Log

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

```
_____ Log Records - All _____

(Day/Time since last POR 115/13:07)
Day Time  SC   QA  PHG_PN  CHG_PN  LT  Extended data bytes (B1-B16)
          B1  B3  B5  B7  B9  B11  B13  B15
113 06:32 0331 02  11                9025 0300 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
```

Where:

SC = Status Code = 0331
QA = Qualifier = 02
PHG_PN = Primary Hardware Group = 11 (no PN associated with PHG 11)
Extended Data:
9025 = TYPE
03 = LOCA
00 = Don't care
01 = Adapter interrupt level
00 = Don't care

Figure 1-9. Log Records Example

Diskettes

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

- Double-sided
- Soft-sectored.
- 1.2MB capacity (Models 51R, 52R, and 53R)
- 2.4MB capacity (Models 61R, 62R, and 63R)

Blank diskettes must be P/N 6109660 (1.2MB) or P/N 72X6086 (2.4MB) or equivalent. Both P/Ns are for a box of 10 diskettes.

The following 3174 diskettes are available:

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

Utility Diskette

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

- Customize
- Copy Files
- Microcode Upgrade
- Configure
- Modify Keyboards
- Merge DSL
- Diagnostics
- Identify Customizing Keyboard
- Merge RPQs
- Patch.

Limited Function Utility Diskette

This diskette is supplied through special order only. It contains the microcode that supports the following functions:

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

Control Diskette

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

DSL Diskette

This is an optional diskette. It contains the microcode that supports the attachment of terminals that require a downstream microcode load, such as a 3290. A DSL diskette would also contain the microcode that supports the Asynchronous Emulation Adapter and its attached devices. Multiple DSL diskettes are normally merged onto one DSL diskette. A second diskette drive or a fixed disk 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 will merge the microcode for the RPQs they are using onto the Control diskette.

3174 Dump Diskette

This diskette (P/N 73X3726) is available from an IBM Parts Distribution Center. It contains the microcode that supports dumping the controller and distributed function terminals.

Operator Panel

The operator panel contains indicators, a keypad, function pushbuttons, and switches used by the IBM service representative for problem determination. See Figure 1-10 for the locations of these items, and see the descriptions that follow.

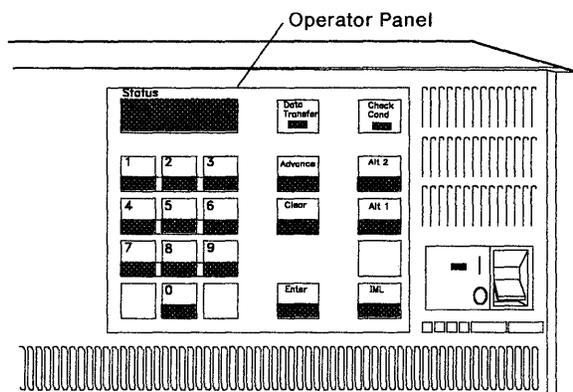


Figure 1-10. 3174 Front Panel

Indicators

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

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

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

Check Cond Indicator: When on, this LED indicates an unrecoverable controller hardware error.

AC Power Switch

The AC Power switch is mounted on the front of the 3174 power supply. When this switch is moved to the on position (I), the green DC indicator comes on if all DC voltages are within tolerance.

Keypad

The keypad contains numeric keys 1–9 and 0. It is used to request functions or tests. Press the desired numeric keys, and the numbers are displayed from left to right in the Status indicators.

Function Pushbuttons

The operator panel contains the following function pushbuttons:

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

These pushbuttons are described in the following paragraphs.

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

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

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

IML Pushbutton: When pressed, this pushbutton performs an indicator test (8888 in the Status indicators). When it is released, all indicators go off, a reset occurs, and an IML starts from the first disk drive with a Control microcode image. The search order for Control microcode is fixed disk drive, diskette drive 1, and then diskette drive 2.

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

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

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

Central Site Change Management

Central Site Change Management is a two-part process.

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

Part 2 allows the customer to distribute his microcode from the central site. This is accomplished either by creating configured diskettes from the central site library and mailing them or by using NetView² Distribution Manager to distribute microcode electronically to his network controllers.

The following types of microcode can be distributed:

- Configuration Data
- RPQ Merge
- DSL
- KDU
- Patch
- AEA Data
- PAM.

² NetView is a trademark of the International Business Machines Corporation.

General Description

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

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

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

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

Normal IML

- Alt 1 using function selection 41
- Alt 1 using function selection 42
- Alt 1 using function selection 43.

Normal IML

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

Alt 1 selection 41

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

Alt 1 selection 42

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

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

Alt 1 selection 43

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

If a trial level does not exist, the production-level will be loaded.

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

IBM Token-Ring Network Gateway Feature

The IBM Token-Ring Network 3270 Gateway, a feature of the IBM 3174 Establishment Controller Models 51R, 61R, and 62R provides for data passage between a Systems Network Architecture host processor and the devices on the IBM Token-Ring Network. See Figure 1-11. The 3174 Models 51R, 52R, 61R, and 62R with the gateway feature can support up to 250 devices on the ring. The customer may, for performance reasons, elect to limit the number of devices that concurrently pass data to the host through the gateway to a number less than the maximum. The gateway feature does not interfere with the ability of ring-attached devices, such as IBM Personal Computers, to communicate with each other on the ring; neither does it affect non-ring terminals that are directly attached to the 3174 Establishment Controller. The addresses of devices attached to the Token-Ring Network are mapped to unique SDLC addresses.

The 3174 Token-Ring Network 3270 Gateway feature can be ordered with 3174 Models 51R, 61R, and 62R or it may be installed by the customer.

The 3174 Token-Ring Network 3270 Gateway feature comprises:

- Token-Ring Adapter
- Utility and Control diskettes
- Cable.

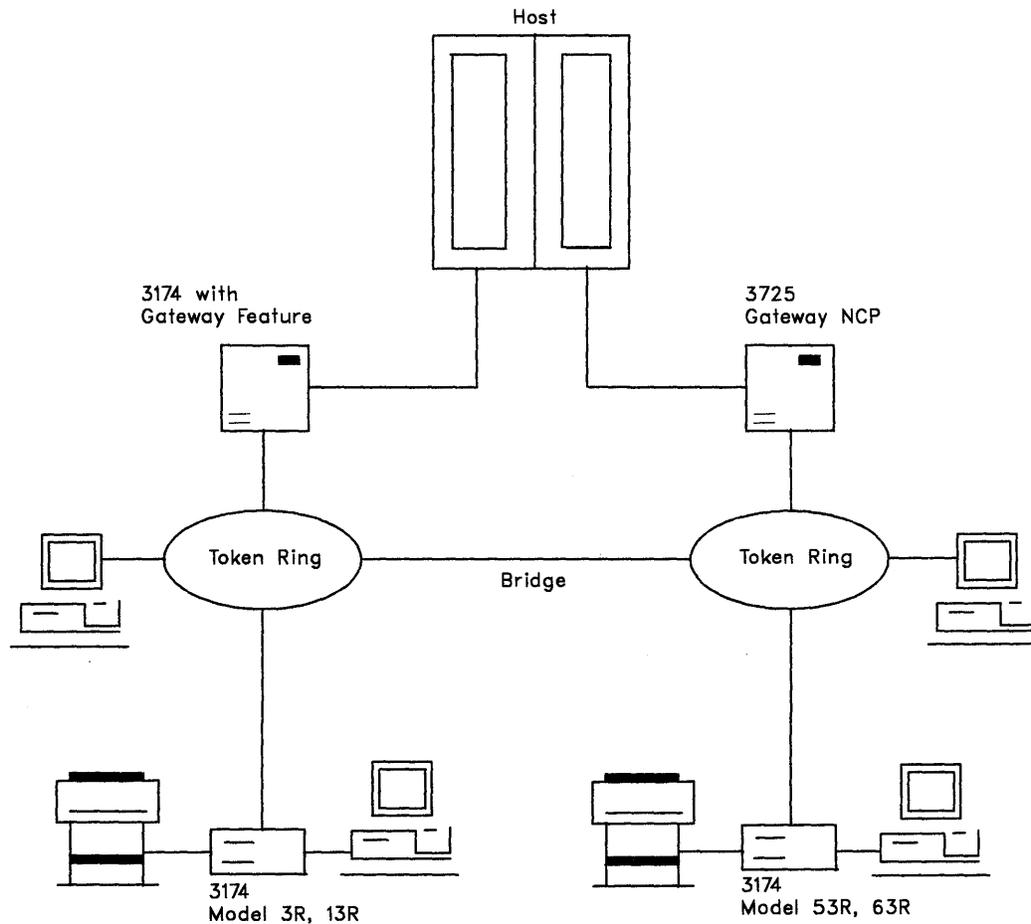


Figure 1-11. 3174 Token-Ring Network Connection

Token-Ring Gateway Feature Microcode

New Utility and Control diskettes are provided with the Token-Ring Network 3270 Gateway feature. Configuration support for all 3174 functions applicable to the SNA Models 51R, 61R, and 62R is included.

The Utility diskette provides the ability to:

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

IBM Token-Ring Network Operation

IBM 3174 Models 51R, 52R, 53R, 61R, 62R, and 63R use the Token-Ring Adapter to interface to the ring to send and receive data. The 3174 tells the Token-Ring Adapter it wants to send a message to another device on the ring. The Token-Ring Adapter places the message, the sender's address, and the receiver's address on a *token* circulating around the ring. That token then becomes a frame.

Each adapter on the ring checks the receiver's address on the frame to see if it should pass the frame to the next adapter on the ring or receive the frame. If an address match occurs, the adapter passes the frame to its attaching device, such as a personal computer and indicates on the frame that it has been received. The frame then continues around the ring until it is received by the Token-Ring Adapter that originally sent it. The Token-Ring Adapter checks the information on the frame to ensure no errors exist and then releases a new token on the ring.

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

Token-Ring Adapter Addressing

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

- Universally administered
- Locally administered.

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

The first 2 bits in byte 0 of the address are 00 for universally administered addresses. Every universally administered address is ensured unique by the Institute of Electrical and Electronic Engineers (IEEE). If the customer uses universally administered addresses, the 3174 must be reconfigured when a Token-Ring Adapter is replaced. This applies to any device on the ring that requires replacement of its Token-Ring Adapter card. The universally administered address for the Token-Ring Adapter in the 3174 can be displayed by using the offline test for the Token-Ring Adapter (HG 31) function number 10. See "How to Run Token-Ring Adapter Optional Tests" on page 2-113.

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

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

3174 Models 53R and 63R Attached to a Token-Ring Network

IBM 3174 Models 53R and 63R provide 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 a 3174 Establishment Controller with the Token-Ring Network 3270 Gateway feature.

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

IBM 3174 Models 51R, 52R, 61R, and 62R can be converted to Models 53R and 63R with a customer-installed model conversion package. No additional storage is needed to make this conversion.

Multi-Host Support

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

Concurrent Communication Adapter

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

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

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

Single Link Multi-Host Support

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

Asynchronous Emulation Adapter Feature

The traditional 3174 Establishment Controller environment consists of 3270 displays and printers communicating through the 3174 with a host system running a 3270 application program. See Figure 1-12.

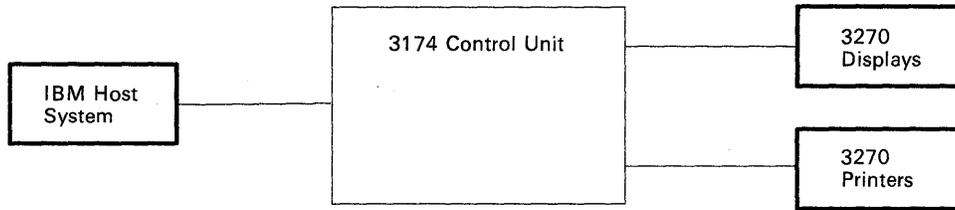


Figure 1-12. 3270 Communication

The Asynchronous Emulation feature expands the connection and control capability of the 3174 to include communication with hosts, displays, and printers that use the American National Standard Code for Information Interchange (ASCII) communications protocol and hosts that use the International Organization for Standardization (ISO 646) National Language Support communications protocol. From now on in this publication, these hosts, displays, and printers will be referred to as ASCII hosts, displays, and printers. See Figure 1-13.

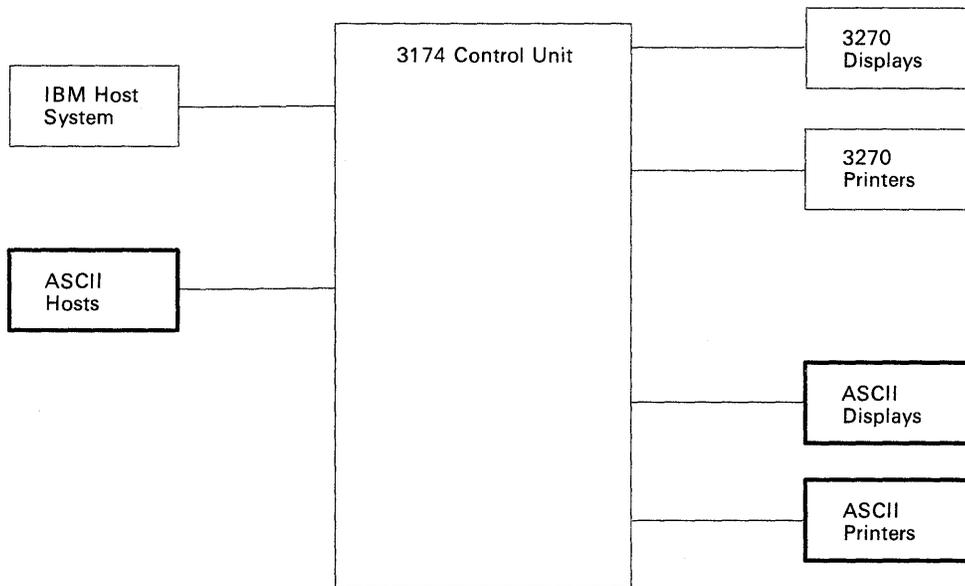


Figure 1-13. ASCII Communication

Asynchronous Emulation Adapter Communication

The AEA feature allows communication between:

- 3270 displays and/or printers to ASCII hosts (see Figure 1-14 on page 1-33)
- ASCII displays and/or printers to IBM hosts (see Figure 1-15 on page 1-33)
- ASCII displays and/or printers to ASCII hosts (see Figure 1-16 on page 1-34).

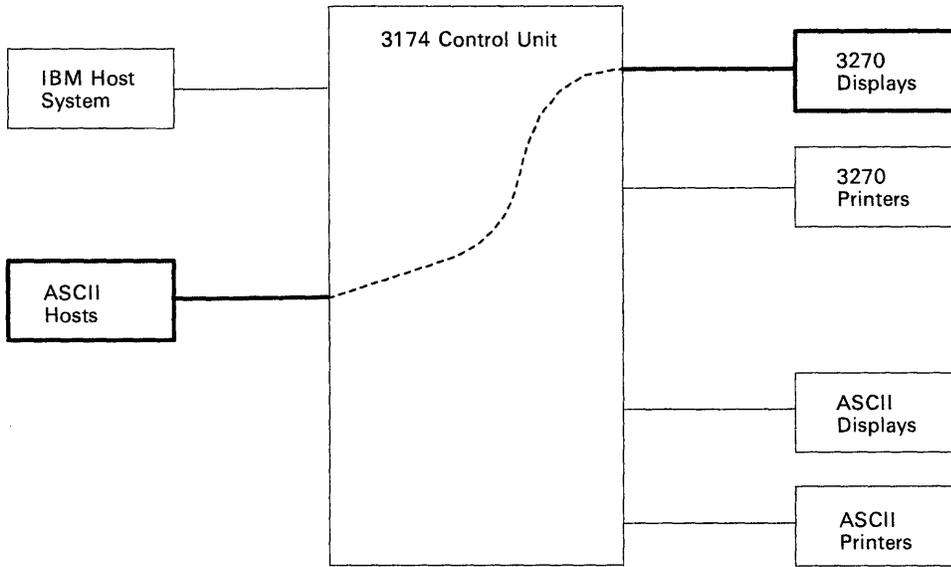


Figure 1-14. 3270 Terminal Communicating with an ASCII Host

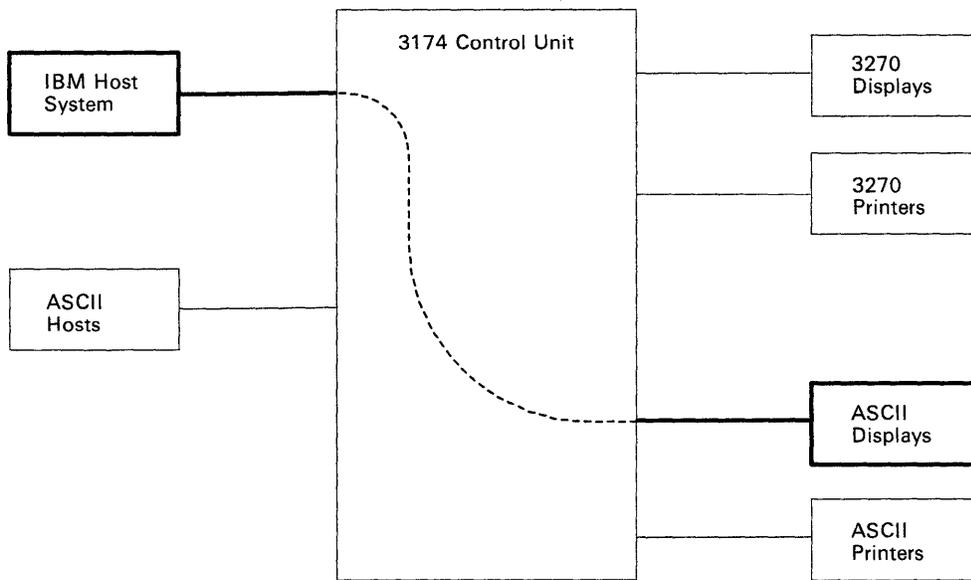


Figure 1-15. ASCII Terminal Communicating with an IBM Host

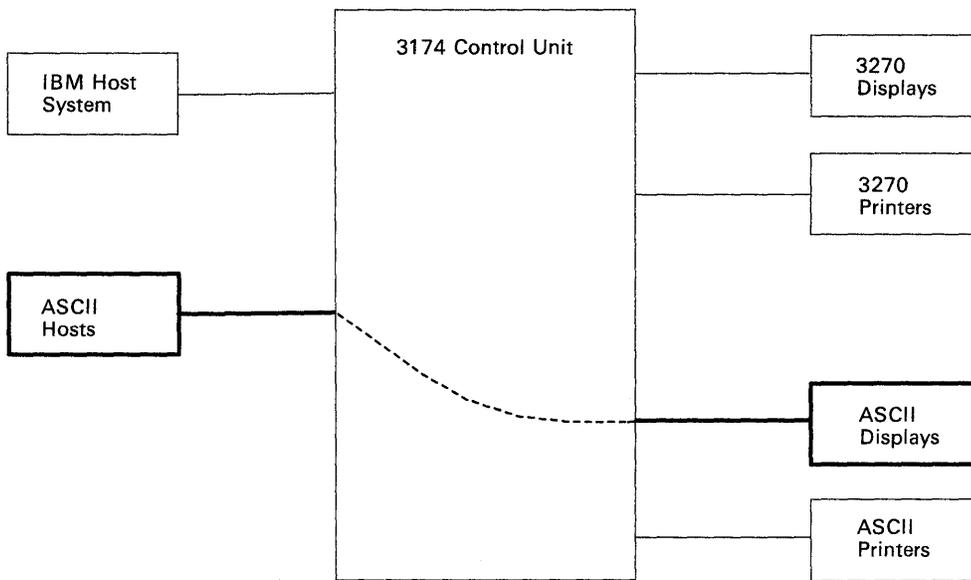


Figure 1-16. ASCII Terminal Communicating with an ASCII Host

Asynchronous Emulation Adapter (AEA) Hardware

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

Models 51R, 52R, 61R, 62R and 63R support the installation of one AEA card and the connection of up to eight ASCII hosts, displays, or printers. See Figure 1-17.

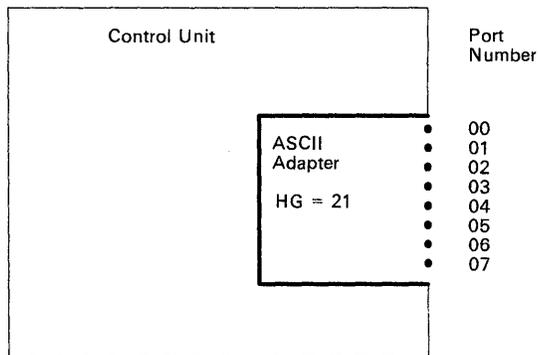


Figure 1-17. Asynchronous Emulation Adapter Hardware

In addition to the adapter card, the feature includes an internal cable between the adapter card and the planar board. The I/O panel has eight 25-pin D-shell port connectors. The port connectors are numbered 0 through 7 and provide the method of connecting the communications link cables. See Figure 1-18.

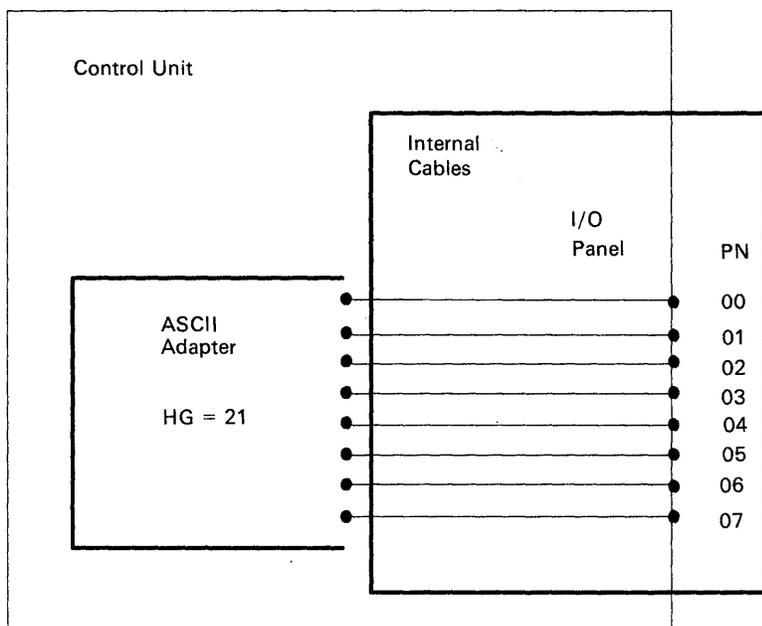


Figure 1-18. AEA I/O Panel

Communication Links and Associated Hardware

Three types of links are available:

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

See Figure 1-19.

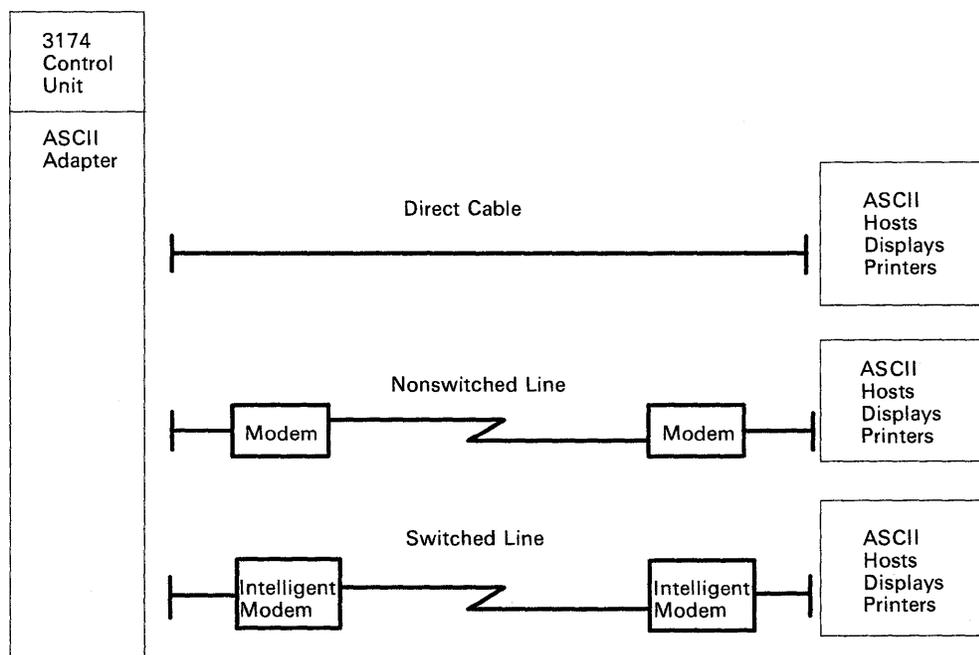


Figure 1-19. Communications Equipment

Physical and Logical Paths

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

The logical path is determined by customizing. This is accomplished by either selecting a default host or presenting a Connection Menu from which the host is chosen by the display user. The ability to customize the logical path makes it easier to change terminal user access to more than one host, particularly when adding a new host access. See Figure 1-20.

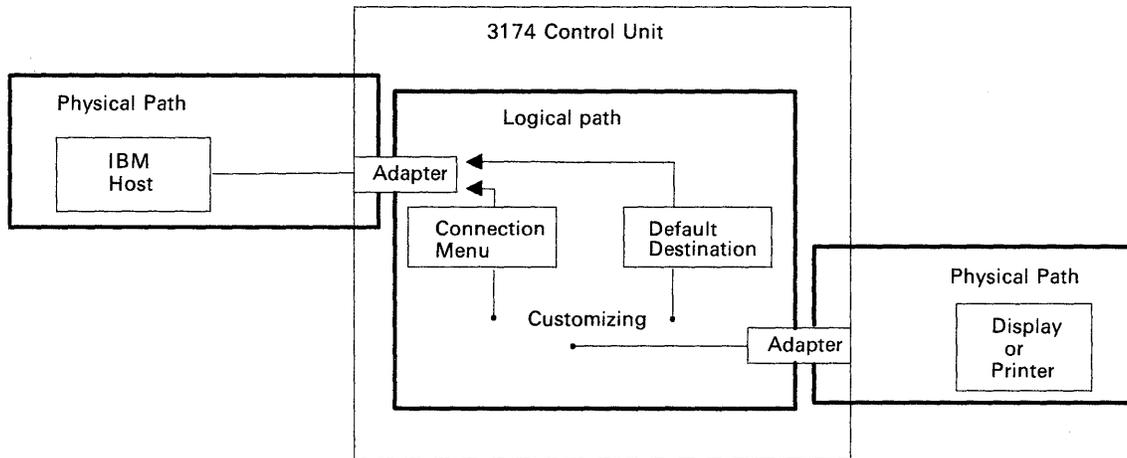


Figure 1-20. Physical and Logical Paths

Logical Path

Printers must be assigned to a host default destination. The host may either be the IBM host or an ASCII host. See Figure 1-21.

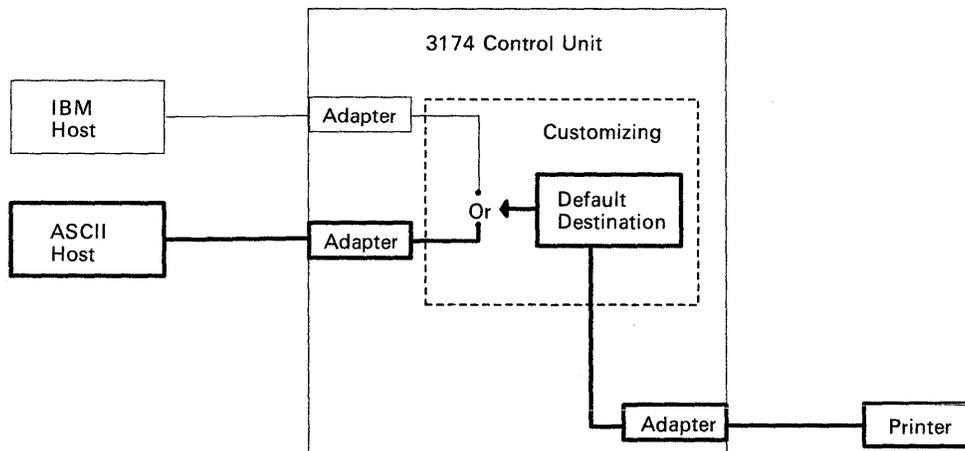


Figure 1-21. Printer Logical Path

Display users may be assigned the Connection Menu or a default host. If assigned to a default host, then the path is the same as the one for printers. See Figure 1-22.

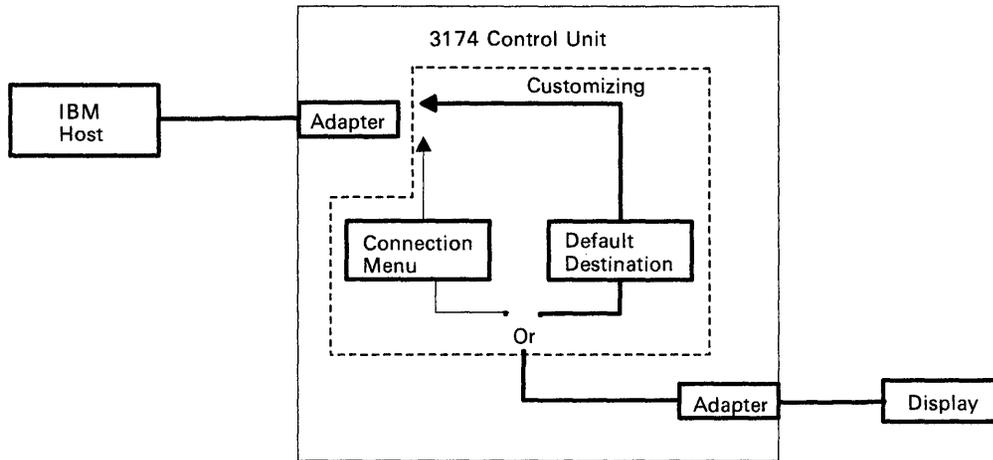


Figure 1-22. Display Logical Path

Connection Menu

The Connection Menu lists all the host connections that can be accessed by the display users. Hosts are identified at customizing time. See Figure 1-23.

```

          _____ Connection Menu _____
Enter a number (NUM) or name on the Command Line

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

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

====> T0: _
    
```

Figure 1-23. Connection Menu

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

- The terminal user may be presented the Connection Menu but is only allowed to select the default host assigned. See Figure 1-24.

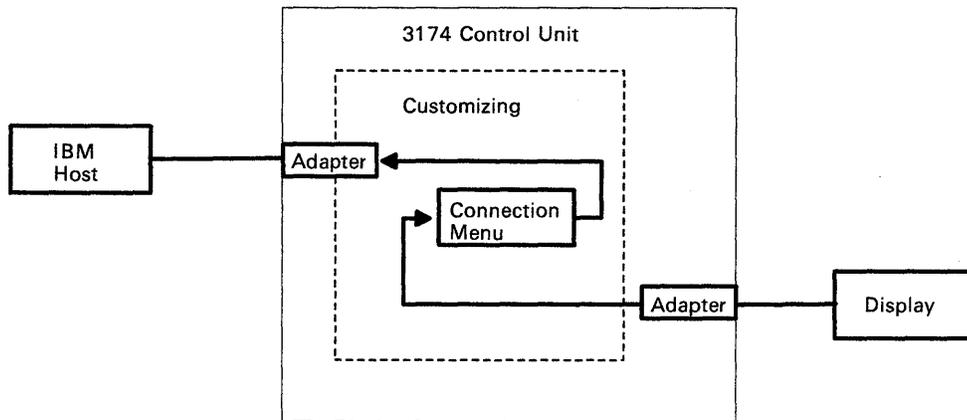


Figure 1-24. Connection Menu Option 1

- The terminal user may be presented the Connection Menu and allowed to select any one of the hosts from the list. See Figure 1-25.

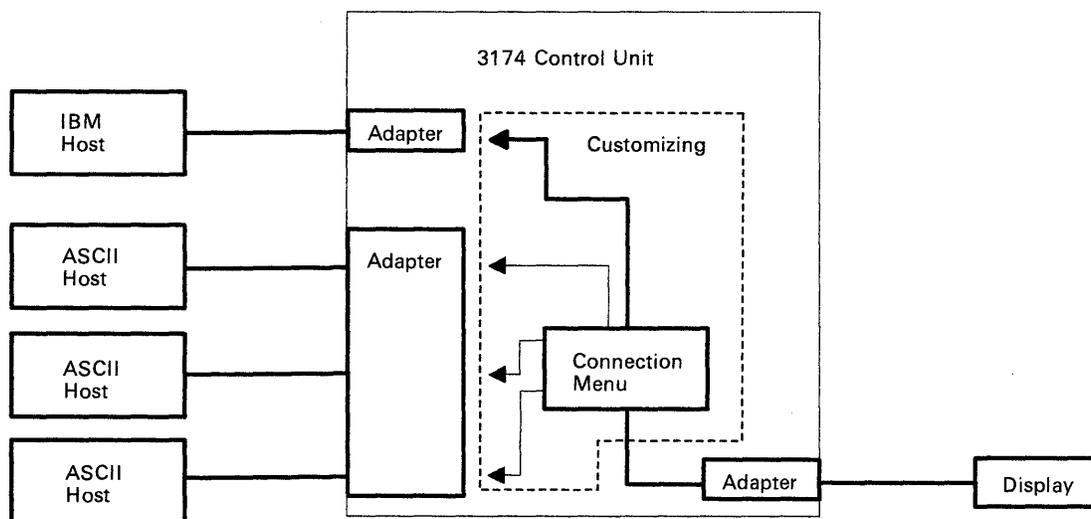


Figure 1-25. Connection Menu Option 2

Customizing

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

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

Many of the stations will have the same characteristics. Because of this commonality among stations, provisions have been made for inputting station information as a *station set*, thus eliminating the need to enter the same information multiple times. See Figure 1-26.

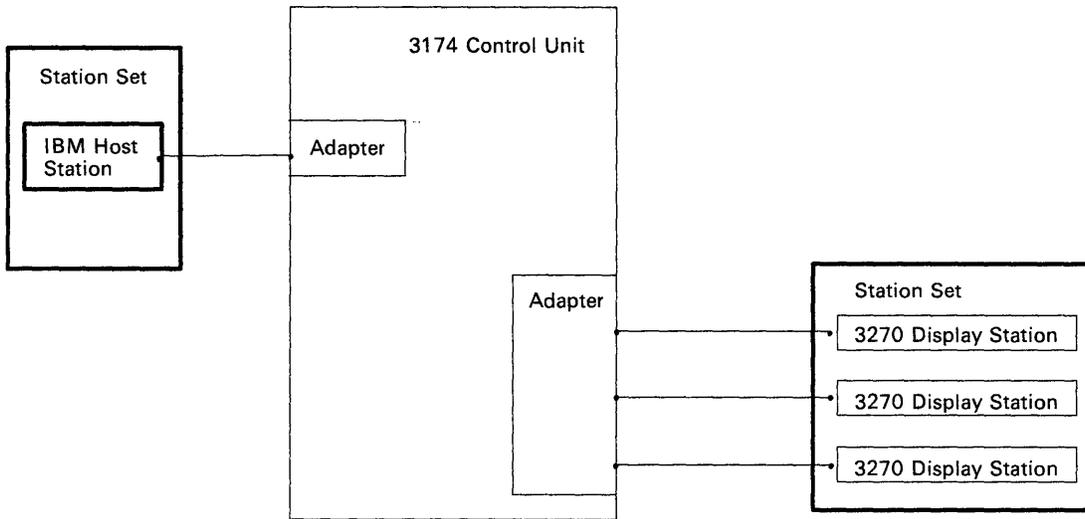


Figure 1-26. Host Set and Terminal Set

Port Type and Port Sets: The port type is used to identify the physical connection to the 3270 terminal adapter and AEA adapter. The 3270 terminal adapter ports accept the traditional coaxial-type cables used to connect 3270-type terminals. The AEA ports accept the cables used to connect direct, nonswitched, and switched communication links.

Many of the port types (coaxial, direct, nonswitched, switched) will be the same for a given station set. Provisions have been provided to group these ports into port sets. See Figure 1-27.

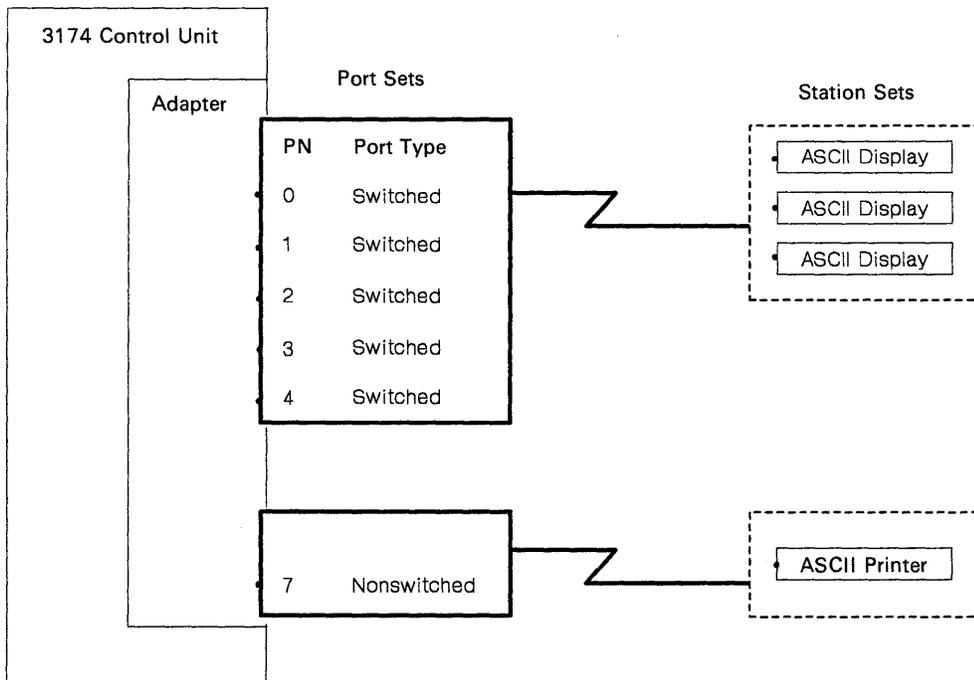


Figure 1-27. Port Sets

Port sets may be used by more than one display station set if the station types of the station sets are different. Different station types are required because the controller cannot identify which station set to connect if both station sets have the same station type and port type. See Figure 1-28.

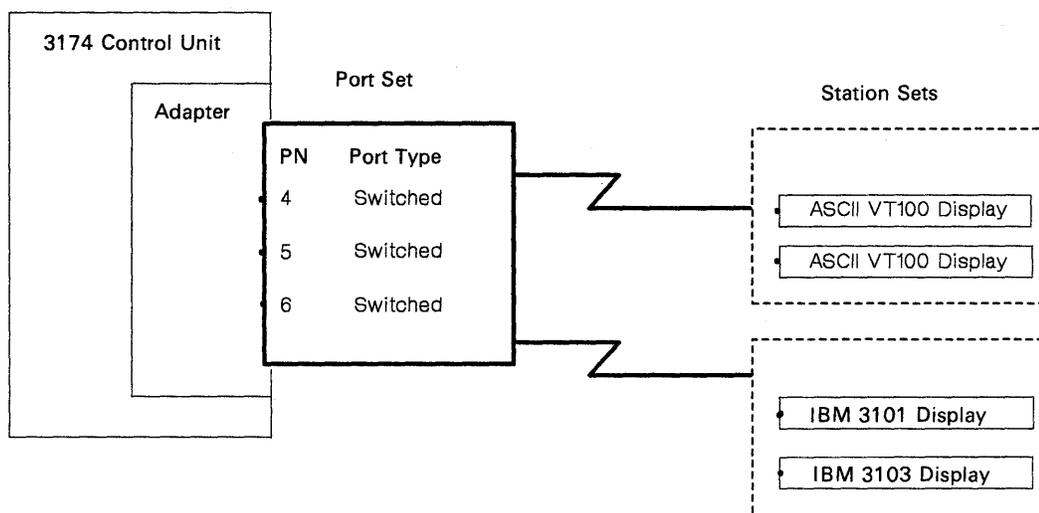


Figure 1-28. Connected Terminal and Port Sets

Power Supply Description

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

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

Power Supply Problem Determination

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

AC Indicator

The AC indicator is green and is located in the AC line filter. (This indicator may not be installed on some machines.) This indicator is visible when the top cover of the controller is removed. (See Figure 3-3 on page 3-4.) This indicator lights when the controller power cable is plugged into a live outlet to verify that the AC voltage is present at the input of the power supply.

DC Indicator

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

- The power supply “power on reset” line is in a constant down (minus) condition.
- The power supply DC voltages are not within the proper tolerances.
- Logic card(s) or the planar board is loading down a voltage or the “power on reset” line.

The power supply can be disconnected to isolate this failure. If the DC indicator stays off, the first or second condition is causing the failure. If the DC indicator turns on, then the third condition is causing the failure. After an overload condition as described above (and after the cause of the overload is removed),

wait a minimum of 2 seconds before turning on power to ensure that the power supply has recovered from the previous overload condition.

DC Voltage Test Points

The DC voltages can be checked at the top of the power supply plug P2. Figure 1-29 shows connector P2 on the power supply that plugs into the planar board. The fans and the diskette drive motors operate on DC voltages.

Note: The power supply problem isolation concept is to replace the supply as a single FRU. Normally, voltages do not have to be measured for proper tolerances unless directed by your support structure.

CAUTION:

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

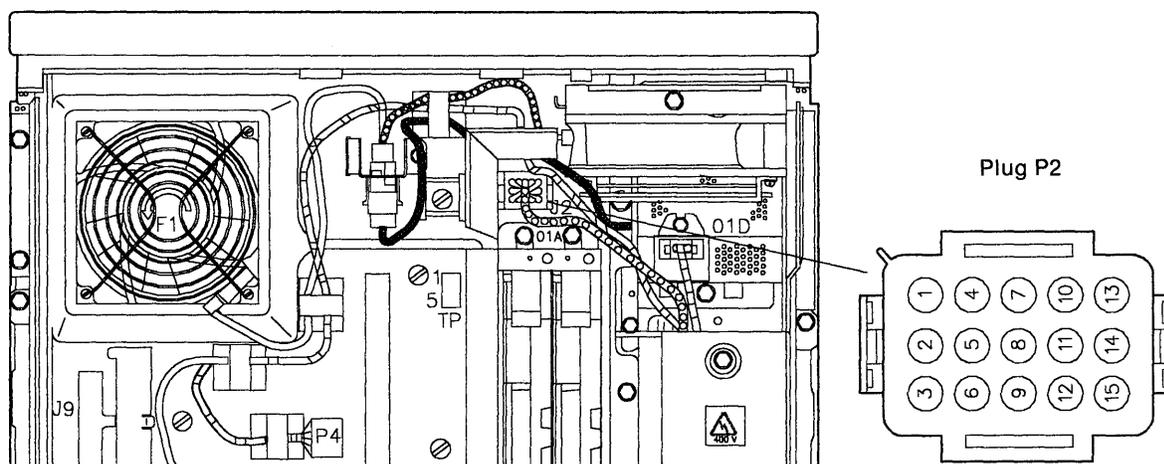


Figure 1-29. Power Supply Plug P2

Power Supply Voltage Chart

The voltages listed in Table 1-5 are present in the 3174 and can be measured at the top of the power supply plug P2. Measure voltages with one meter lead on a DC return pin.

Table 1-5. DC Voltage Chart		
Voltage	Test Point at Plug P2	DC Limits
-5	12	-4.55 to -5.4
+ 12	4	+ 11.28 to + 12.72
-12	6	-10.92 to -12.96
+ 5.1	1,3,13,15	+ 4.90 to 5.25
DC Return	2,5,8,11,14	

Normal Initial Microcode Load (IML)

A normal IML is required to bring the 3174 to an operational state, where the controller can communicate with a host system. A normal IML is started by turning on the controller, or by pressing the IML pushbutton after the controller is powered on. IML occurs from the first IML device that is ready and has a configured Control microcode image installed. IML device selection is fixed disk drive, diskette drive 1, then diskette drive 2. If a failure or an unusual status condition occurs during any portion of the IML sequence, a status code is displayed on the 3174 operator panel. During a normal IML, the following tests run:

- Processor ROS tests
- File adapter pretest
- Storage
- Extended tests load from the diskette
- Extended processor tests.

Alt 1 IML Operations

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

Alt 1 IML Procedures

Before starting this procedure, if the function number being used is:

- 41, 42, or 43 Control microcode is required.
- 40, 80, 81, 82, or 87, a Utility microcode is required.

When performing the Alt 1 IML procedure, select the parameters from Table 1-6 on page 1-43.

1. If you are going to perform an Alt 1 IML from diskette, insert the proper diskette at this time.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. At 40, key in the IML device (DS) and the function selection (FS).
6. Press Advance and go to step 7, or press Enter to execute.
7. Key in the test parameter (TP) (valid only with function selection numbers 81, 82, and 87).
8. Press Enter.

Table 1-6. Alt 1 IML Selections

IML Device, Function and Parameter Selections

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

Notes:

1. If an IML device (DS) is not entered, ROS will default to DS = 01.
2. If no input parameters are entered (Enter pressed without any data), ROS will default to DSFS = 0140.
3. If storage initialization is bypassed, ROS will bypass the tests for the file adapter.
4. Auto device selection causes ROS to try to load operational microcode from each IML device. Device search order is fixed disk, 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 in order to complete successfully. For details, see "Test All 81 (CSU)" on page 2-80.
7. Test function 82 is performed to test the controller after the controller has been installed. See "Alt 2 IML Procedures (Test 82)" on page 1-45.

Alt 1 Normal IML Description

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

- Processor ROS tests
- Storage on the planar board
- File adapter pretest
- Extended tests load from the diskette or fixed disk
- Extended processor tests
- Remainder of storage.

Alt 1 Normal IML Procedure

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

Format = DS41

1. Select an IML device (DS) and storage option. See Table 1-6.
2. If you are going to IML from a diskette, insert the proper diskette into the correct drive.
3. Press and hold Alt 1.
4. Press and release IML.
5. Release Alt 1.
6. At 40, key in **DS41**
7. Press Enter; execution begins.

Example of an Alt 1 IML

Where:

12 = Diskette 2 with storage initialization
41 = Load operational microcode

1. Insert the proper diskette into drive 2.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. At 40, key in **1241**.
6. Press Enter; execution begins.

Alt 2 IML Procedures (Test 82)

This section describes how to run Test 82. There are two procedures available. In one procedure, you test the controller using the Alt2 pushbutton. In the other procedure, you test the controller using the Alt1 pushbutton. The procedure you use depends on the following:

- If the Utility microcode is stored on the fixed disk, use "Procedure B – Test 82" on page 1-46.
- If the controller is Models 51R, 52R, and 53R with two diskette drives and drive 2 is labeled 2.4, use "Procedure B – Test 82" on page 1-46.
- For all other cases, use "Procedure A – Test 82."

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

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

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

Procedure A – Test 82

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

1. Have the host operator take the controller offline.
2. Insert a Utility diskette into diskette drive 1. If the controller has two diskette drives, insert a Control diskette into drive 2, making sure that if the diskette is labeled 2.4, the drive is also labeled 2.4
3. Press and hold Alt 2.
4. Press and release IML.
5. Release Alt 2.

Progress numbers will appear in the Status display of the operator panel as the test runs (1 to 3 minutes). If the test runs successfully, 2082 will appear in the Status display. If the test stops with a number other than 2082, look up that number in the *IBM 3174 Status Codes* manual.

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. Insert the Utility diskette into:
 - Drive 1 on single diskette-drive controllers.
 - Drive 2 on two diskette-drive controllers. Then insert a Control diskette into drive 1, making sure that if the diskette is labeled 2.4 that the drive is also labeled 2.4.
3. Press and hold Alt 1.
4. Press and release IML.
5. Release Alt 1.
6. At 40, key in **0X82**, where:
 - 0X = 02 = Access the Utility microcode in Diskette Drive 2.
 - 0X = 03 = Access the Utility microcode on the Fixed Disk.
 - 82 = Load and run the Alt 2 tests.
7. Press Enter.

Progress numbers will appear in the Status display of the operator panel as the test runs (1 to 3 minutes). If the test runs successfully, 2082 will appear in the Status display. If the test stops with a number other than 2082, look up that number in the *IBM 3174 Status Codes* manual.

Environmental Restrictions

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

Environmental Classifications

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

3174 Temperature and Humidity Limits

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

3174 Acoustics

The maximum allowable 3174 DbA output is 46 DbA.

Special Tools and Test

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

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

See "How to Run Communication and Concurrent Communication Adapter Optional Tests" on page 2-99 for details about using the communication adapter wrap plugs.

EIA/V.35 Wrap Plug

The EIA/V.35 wrap plug (P/N 6423419) is used to test the Type 1 communication adapter. See Figure 1-30. This wrap plug can be connected directly to the communication port on the planar board or on the end of the EIA cable and the V.35 cable with three Test/Oper switches.

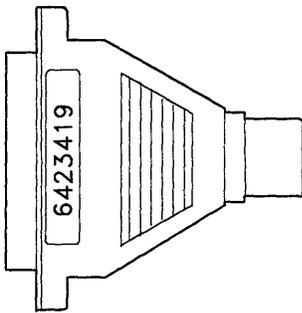


Figure 1-30. EIA/V.35 Wrap Plug

X.21 Wrap Plug

The X.21 wrap plug (P/N 6423420) is used to test the Type 2 communication adapter. See Figure 1-31. This wrap plug can be connected directly to the communication port on the planar board, or on the X.21 interface cable.

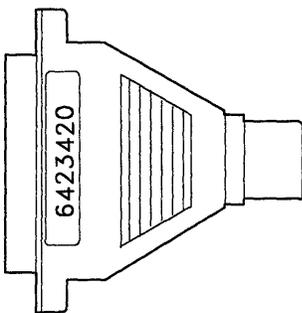


Figure 1-31. X.21 Wrap Plug

V.35 Cable Wrap Plug

The V.35 cable wrap plug (P/N 61X4603) is used to test the V.35 cables that have one Test/Oper switch on the end of the cable. This cable was shipped with early-production machines. Later machines have three Test/Oper switches on the interface cable. See Figure 1-32. This wrap plug can be connected on the end of the interface cables with one Test/Oper switch.

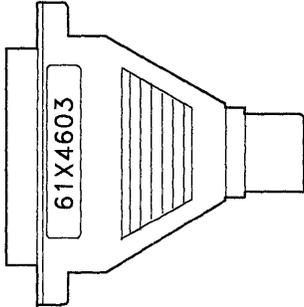


Figure 1-32. V.35 Wrap Plug

Token-Ring Adapter Wrap Plug

The Token-Ring adapter wrap plug (P/N 6165899) is used to test the Token-Ring adapter. This wrap plug is connected to the nine-pin receptacle on the rear of the controller. See Figure 1-33.

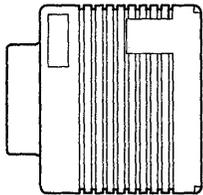


Figure 1-33. Token-Ring Adapter Wrap Plug

Asynchronous Emulation Adapter Wrap Plug

The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) is used to test the Asynchronous Emulation Adapter port and, in some cases, the communication cable. See Figure 1-34.

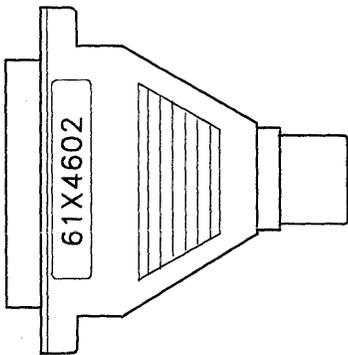


Figure 1-34. Asynchronous Emulation Adapter Wrap Plug

Chapter 2. Diagnostic Information

Introduction	2-5
Start	2-5
Initial Symptom Chart	2-5
MAP 0100: Check Condition Ind Is On with Blank Status	2-7
MAP 0110: Operator Panel Isolation	2-9
MAP 0120: Status Code Not Indicated or Known	2-12
MAP 0200: Terminal Device(s) Problem Entry	2-13
MAP 0210: Terminal Adapter Isolation	2-14
MAP 0220: Terminal Attachment Configuration Chart	2-16
MAP 0230: 3299 Model 2, 3 Isolation	2-17
MAP 0240: 3299 Model 1 Isolation	2-23
MAP 0250: Terminal(s) Device(s) Isolation	2-28
MAP 0300: Host Remote 3174 Isolation	2-30
MAP 0430: File Failures	2-34
MAP 0600: Token-Ring Network 3174 Isolation	2-36
MAP 0700: DC Indicator Is Off	2-39
MAP 0710: Power Load Isolation	2-41
MAP 1000: ASCII Problem Entry	2-43
MAP 1010: All ASCII Ports Are Failing	2-47
MAP 1020: Direct Connection Port—Any Failure	2-49
MAP 1030: Nonswitched Connection Port—Any Failure	2-56
MAP 1040: Switched Connect Ports—Any Failure	2-64
MAP 1050: 3278 (or Equivalent) Terminal Failing to Communicate to ASCII Host	2-78
Diagnostic Aids: Offline Tests	2-80
Hardware Group Test Alls and Processor/Storage Tests	2-80
Test All 81 (CSU)	2-80
Test All 82 (Alt 2 IML)	2-81
Test All 87	2-81
Hardware Group Basic Tests	2-81
Hardware Group Optional Tests	2-82
Test Request Format	2-82
Test Parameters	2-84
Loop	2-84
Terminal Control	2-84
Stop on Error	2-84
How to Load the Test Monitor	2-84
Loading the Test Monitor from Diskette Drive 1	2-84
Loading the Test Monitor from Diskette Drive 2	2-85
Loading the Test Monitor from Fixed Disk	2-85
Terminal Control Test Menus	2-86
How to Run Hardware Group Test Alls or Processor/Storage	2-88
How to Run Hardware Group Basic Tests	2-89
How to Run Diskette Drive Optional Tests	2-90
Diskette Drive Ready Test	2-90
Diskette Drive Media Surface Test (FN 02)	2-90
How to Run Fixed Disk Drive Optional Tests	2-91
Fixed Disk Drive Surface Scan (FN 31)	2-91
Fixed Disk Drive Defect Fix (FN 32)	2-92
Fixed Disk Drive Full Format (FN 33)	2-93
Display Fixed Disk Scan Defect Table (FN 34)	2-93
Scan Defect Table Output	2-94
CSU Surface Scan (FN 51)	2-95

How to Read and Set the Timer	2-97
How to Read the Timer (FN 01)	2-97
How to Set the Timer (FN 02)	2-97
How to Run the Operator Panel Test	2-98
How to Run Communication and Concurrent Communication Adapter Optional Tests	2-99
Communication Adapter Function Number Descriptions	2-99
V.35 Cable Wrap Test (Three Test/Oper Switches)	2-100
V.35 Cable Wrap Test (One-Switch Test/Oper Switch)	2-101
How to Run Asynchronous Emulation Adapter Optional Tests	2-105
Asynchronous Emulation Adapter Function Number Description	2-105
Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring	2-106
Switched and Nonswitched Modem Cable	2-106
Direct Cable	2-107
Direct Cabling Using a Null Modem	2-108
Asynchronous Emulation Adapter Wrap Plug Wiring	2-109
How to Run Terminal Adapter/Multiplexer Optional Tests	2-110
Terminal Adapter Function Number Descriptions	2-111
How to Run Token-Ring Adapter Optional Tests	2-113
Token-Ring Adapter Function Numbers	2-114
Token-Ring Adapter Replacement Considerations	2-114
How to Display the Test Log	2-116
Test Log Function Number Descriptions	2-116
How to Display the Test Monitor Functions (Terminal Control)	2-118
Test Monitor Function Number Descriptions	2-118
Display Test Log – IML Drive (FN 02)	2-118
Diagnostic Aids: Online Tests	2-120
Online Tests Configuration A5/S5	2-120
Introduction	2-120
3174 Test Menu	2-123
Online Test Format	2-124
Test 0: Terminal Check	2-125
Test 1: Display Logs Menu	2-126
Test 1, Option 1	2-130
Reset the Response Time Monitor	2-131
Test 2: Configuration Menu	2-132
Test 2, Option 1	2-133
Test 3: 3270 Device Status Information	2-134
Test 3, Option 1	2-135
Test 3, Option 2	2-137
Test 3, Option 3	2-138
Test 4: Reset Logs and Cable Errors	2-139
Test 5: Display Vital Data	2-140
Test 5, Option 1	2-141
Test 5, Option 2	2-142
Test 6: Display Control Blocks	2-143
Test 6, Option 2	2-144
Port Control Area Bit Definitions	2-146
LT Control Area Bit Definitions	2-148
Test 6, Option 3	2-151
Link Counters	2-154
Circuit Counters	2-154
Test 7: Color Convergence	2-155
Test 8: Extended Functions and Programmed Symbols	2-155
Test 9: Display the Token-Ring Test Menu	2-156
Test 9, Option 1	2-157
Test 9, Option 2	2-158

Test 9, Option 4	2-160
Primary States	2-161
Secondary States	2-163
Test 9, Option 8	2-164
Test 10: Port Wrap Tests	2-166
Test 11: Trace Control	2-167
Trace Control Mode	2-167
How to Use the Trace Facility	2-167
Trace Facility Options	2-168
How to Start a Foreground Trace	2-168
How to Start a Background Trace	2-169
Test 12: Asynchronous Emulation Adapter Tests	2-170
Test 12, Option 1	2-171
Test 12, Option 2	2-174
Test 12, Option 4	2-176
Test 12, Option 5	2-177
Test A: Operator-Originated Alerts	2-178
Test D: Distributed Function Terminal Dump	2-180
Online Tests Configuration B	2-181
Introduction	2-181
3174 Test Menu Configuration B	2-184
Online Test Format	2-185
Test 0 Configuration B: Terminal Check	2-186
Test 1 Configuration B: Display Logs Menu	2-187
Log Records Example	2-189
Test 1, Option 1	2-191
Reset the Response Time Monitor	2-192
Test 2 Configuration B: Configuration Menu	2-193
Test 2, Option 1	2-194
Test 3 Configuration B: 3270 Device Status Information	2-195
Test 3, Option 1	2-196
Test 3, Option 2	2-198
Test 3, Option 3	2-198
Test 3, Option 4	2-199
Test 4 Configuration B: Reset Logs and Cable Errors	2-201
Test 5 Configuration B: Display Vital Data	2-202
Test 5, Option 1	2-203
Test 5, Option 2	2-204
Test 6 Configuration B: Display Control Blocks	2-205
Test 6, Option 2	2-206
Port Control Area Bit Definitions	2-208
LT Control Area Bit Definitions	2-210
Test 6, Option 3	2-213
Link Counters	2-216
Circuit Counters	2-216
Test 7 Configuration B: Color Convergence	2-217
Test 8 Configuration B: Extended Functions and Programmed Symbols	2-217
Test 9 Configuration B: Display the Token-Ring Test Menu	2-218
Test 9, Option 1	2-219
Test 9, Option 2	2-220
Test 9, Option 4	2-222
Primary States	2-223
Secondary States	2-225
Test 9, Option 8	2-226
Test 10 Configuration B: Port Wrap Tests	2-228
Test 11 Configuration B: Trace Control	2-229

Trace Control Mode	2-229
How to Use the Trace Facility	2-229
Trace Facility Options	2-230
How to Start a Foreground Trace	2-230
How to Start a Background Trace	2-231
Test 12 Configuration B: Asynchronous Emulation Adapter Tests	2-232
Test 12, Option 1	2-233
Test 12, Option 2	2-235
Test 12, Option 4	2-237
Test 12, Option 5	2-238
Test A Configuration B: Operator-Originated Alerts	2-239
Test D Configuration B: Distributed Function Terminal Dump	2-241
General Procedures	2-242
How to Display the Master Menu	2-242
How to Perform the Coaxial Cable Ground Loop Check	2-245
Step 1: AC Voltage Check	2-245
Step 2: Coaxial Resistance Check	2-245
Step 3: Terminal Ground Check	2-246
Step 4: Coaxial Cable to Terminal Check	2-246
How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)	2-247
How to Perform an Operator Panel Lamp Test	2-247
Modem Specifications and Switch Settings	2-247
Modems	2-247
IBM 5841 and 5842 Setup	2-248
Hayes SmartModem 1200 Setup	2-249
Micom Data Modems	2-250
How to Use the 3174 Patch Procedure	2-250
PC Patches	2-250
Zap Patches	2-251
Processing a Patch	2-251
Starting the Patch Procedure	2-251
Adding a Patch	2-253
Adding a Zap Patch	2-257
Processing an Existing Patch	2-259
How to Use the 3174 Dump Procedure	2-260
How to Analyze a 3174 Dump Failure	2-261
3174 Models 51R, 52R, 61R, and 62R Controller OLTs	2-262
Applicable Executive Control Program	2-262

Introduction

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

Start

Initial Symptom Chart

Scan the following chart **sequentially** and match your symptom to a symptom in the chart, then perform the recommended action for that symptom.

Table 2-1 (Page 1 of 2). Initial Symptom Chart		
No	Symptom	Action
1	DC Power indicator is off.	Go to "MAP 0700: DC Indicator Is Off" on page 2-39.
2	Status code or alternating codes.	Go to the <i>IBM 3174 Status Codes</i> manual. For multiple Status Codes see "Multiple Operational Status Codes" on page 1-16. Note: If the code is not found in the Status Code Chart go to "MAP 0110: Operator Panel Isolation" on page 2-9.
3	Check Condition indicator is on with blank status code.	Go to "MAP 0100: Check Condition Ind Is On with Blank Status" on page 2-7.
4	Status code not indicated or known.	Go to "MAP 0120: Status Code Not Indicated or Known" on page 2-12.
5	Any operator panel failure such as key function, prompt message, Status code, and indicators.	Go to "MAP 0110: Operator Panel Isolation" on page 2-9.
6	Terminal adapter device(s) failing.	Go to "MAP 0200: Terminal Device(s) Problem Entry" on page 2-13.
7	ASCII Host/Terminal device(s) failing.	Go to "MAP 1000: ASCII Problem Entry" on page 2-43.
8	Token-Ring Network Attachment Models 53R and 63R: All problems between the 3174 and the Token-Ring Network.	Go to "MAP 0600: Token-Ring Network 3174 Isolation" on page 2-36.
9	All problems between the host and the 3174.	Go to "MAP 0300: Host Remote 3174 Isolation" on page 2-30.
10	The IML only fails to start after power is switched on.	This failure may display a blank, 8888, or any other code. Replace the power supply. Note: Be sure to use the same type/part number for your replacement.
11	Fan(s) not turning.	Repair or replace as needed

Table 2-1 (Page 2 of 2). Initial Symptom Chart		
No	Symptom	Action
12	Voltage	<p>Measure voltages for proper limits at the cable connection to the board. See Figure 1-29 on page 1-41.</p> <p>If voltage(s) are missing, then visually inspect the Power Supply Plug P2 and Board Socket J2 for defects.</p> <p>Replace the planar board. See "Planar Board Removal" on page 3-19.</p>

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

MAP 0100: Check Condition Ind Is On with Blank Status

Symptom Explanation	Conditions That Could Cause This Symptom
The check Cond indicator is lit, indicating a pending status code or a failing 3174.	<ul style="list-style-type: none"> The 3174 status code is pending. The 3174 hardware or software is failing.

CAUTION:

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

001

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

Are the status indicators blank (no lights)?

Yes No

002

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

003

- While pressing the IML switch, verify that 8888 is displayed in the status indicators.

Is 8888 displayed?

Yes No

004

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

005

- Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-45.

Is 2082 displayed?

Yes No

006

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

007

Is the Check Cond indicator still on?

Yes No

008

Go to Step 010 on page 2-8.

009

- Exchange the planar board assembly.
(Step 009 continues)

009 (continued)

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

010

(From step 008)

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-42.

Did the 3174 successfully IML?

Yes No

011

Replace the Power Supply.

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

012

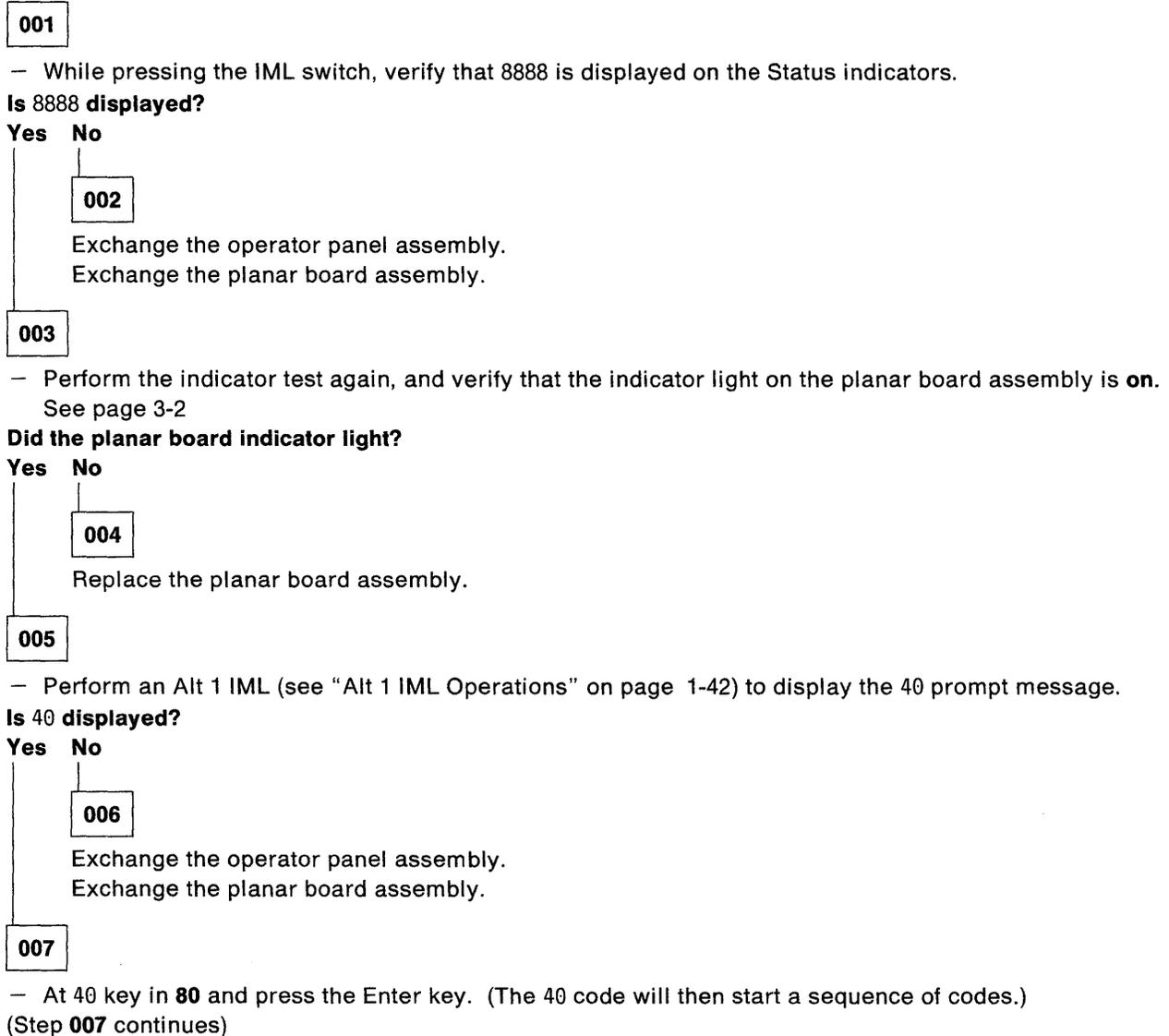
- Return the 3174 to the customer.
-

MAP 0110: Operator Panel Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
The operator panel is failing in one or more of its functions.	<ul style="list-style-type: none"> Defective operator panel assembly. Defective planar board assembly.

CAUTION:

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



007 (continued)

Is 4001 displayed?

Yes No

008

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

009

- Perform the operator panel diagnostic test. Key in **09** (HG) and press Enter to display the 4505 prompt message.

Is 4505 displayed?

Yes No

010

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

011

- Press the following keypad keys and visually verify the expected characters.

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

Were the characters correct?

Yes No

012

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

013

Press any key (0–9), and observe the following sequence.

- The Check Cond indicator (red) goes off.
- Then the Data Transfer indicator (green) goes on for about 2 seconds.
- About 5 seconds later the Check Cond indicator (red) goes on.
- Press the Enter key (Expected = 2009).

(Step **013** continues)

013 (continued)

Was the indicator test as expected (status code = 2009)?

Yes No

014

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

015

- Press the Enter key to end the test.
- Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

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

MAP 0120: Status Code Not Indicated or Known

Symptom Explanation	Conditions That Could Cause This Symptom
Status code not indicated at the 3174 operator panel, or the status code is not known.	<ul style="list-style-type: none">• Status code is indicated at the failing display.• Status code is stored in the 3174; use test 1 event log.

001

Try to obtain a status code by the following:

- Check for a status code in the operator information area (OIA) on a terminal.
- At a working 3278-type display, use Test 1 event log (option 2). See “Test 1: Display Logs Menu” on page 2-126.

Did you find a status code?

Yes No

002

Continue with the next symptom in the Initial Symptom Chart 2-5

003

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

MAP 0200: Terminal Device(s) Problem Entry

001

Scan the following chart **sequentially** and match your device failure with one of the symptoms in the chart. Then take the action specified for that symptom.

SYMPTOM	ACTION
All attached devices are failing.	Go to Step 002.
One or more attached devices are failing.	Go to "MAP 0210: Terminal Adapter Isolation" on page 2-14.
Symptom not known.	Use Test 3 (see "Test 3: 3270 Device Status Information" on page 2-134) or get more information from the customer and use this symptom chart again.

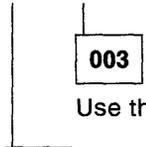
002

(From step 001)

– Perform an Alt 2 IML. See "Alt 2 IML Procedures (Test 82)" on page 1-45.

Is 2082 displayed?

Yes No



003

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

004

Further isolation is required. Go to "MAP 0210: Terminal Adapter Isolation" on page 2-14.

MAP 0210: Terminal Adapter Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Terminal device(s) failing.	<ul style="list-style-type: none"> Defective planar board. Defective terminal adapter output cable at one of its ports (0–8).

CAUTION:

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

001

Is the failing port number known?

Yes No

002

To identify the failing port, use:

- The Subsystem Cabling Worksheets.
- Online Test (3). See "Test 3: 3270 Device Status Information" on page 2-134.

Then continue with Step 003.

003

(From step 002)

- If only the terminals that are directly attached to the 3174 ports 1 through 7 are failing, check that a 3299 is not attached to port 0.
- See Figure 1-2 on page 1-7 and Figure 1-3 on page 1-8.

Terminal Adapter Wrap Test

- Run a wrap test to the failing port at the terminal adapter port. Use test 10 option 1,xx (xx = 00-08). See "Test 10: Port Wrap Tests" on page 2-166.

If unable to run online use the following offline method.

- Load the Test Monitor to display the 4001 prompt message. See "How to Load the Test Monitor" on page 2-84.
- At 4001 key in **2601**. (If using operator panel control, press Advance.)
- Key in the port number (00-08) for the terminal adapter port, and press Enter.
- Use the message on the terminal or the status code on the operator panel to verify the wrap test results for a success or failure.

Does the status code indicate a failure? See the *IBM 3174 Status Codes manual*.

Yes No

004

Go to "MAP 0220: Terminal Attachment Configuration Chart" on page 2-16 and continue problem isolation.

005

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

(Step 005 continues)

005 (continued)

- Disconnect the failing port's output cable at the terminal adapter port. See Figure 1-3 on page 1-8.
- Perform the wrap test on the failing port again.

Does the failure still occur? See the IBM 3174 Status Codes manual.

Yes No

006

Reconnect the port output cable.

Go to "MAP 0220: Terminal Attachment Configuration Chart" on page 2-16 and continue problem isolation.

007

Replace the planar board.

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

MAP 0220: Terminal Attachment Configuration Chart

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

To identify your device configuration, use:

- a. The Subsystem Cabling Worksheets.
- b. The customer's equivalent device subsystem cabling configuration.

001

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

DEVICE CONFIGURATION	ACTION
Device (s) attached to a 3299 Model 2, 3 (wrappable).	Go to "MAP 0230: 3299 Model 2, 3 Isolation" on page 2-17.
Device(s) attached to a 3299 Model 1 (nonwrappable).	Go to "MAP 0240: 3299 Model 1 Isolation" on page 2-23.
Device attached directly to a 3174 port.	Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

MAP 0230: 3299 Model 2, 3 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
<p>Device or devices attached to a 3299 Model 2, 3 (wrappable) fail.</p> <p>The 3299 is a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on the 3299 is a customer responsibility. This MAP has been included to help you do subsystem PD when a 3299 is involved.</p>	<ul style="list-style-type: none"> • No AC power to the 3299. • 3299 input and output cables incorrectly connected. • Defective signal cable to 3299 input. • Defective 3299. • The attached device is failing. • The attached device signal cable is failing. • Replacing a 3299-2 with a 3299-1. • Multiple devices and signal cables are failing.

CAUTION:

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

001

Do you know which device or devices are failing?

Yes No

002

Run Online Test 3, or get more information from the customer. See "Test 3: 3270 Device Status Information" on page 2-134. Continue with Step 003.

003

(From step 002)

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

Yes No

004

A single device attached to the same 3299 is failing. Note the failing port number, and go to Step 023 on page 2-20.

005

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

Yes No

006

Some attached devices to the same 3299 are failing. Go to Step 023 on page 2-20.

007

(Step 007 continues)

007 (continued)

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

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

Is the 3299 red indicator on?

Yes No

008

Verify that the power cable is inserted into the 3299 and is also plugged into a powered outlet.
Replace the 3299 with the same model (3299 model 2 or 3).

009

Are eight devices attached to the same 3299?

Yes No

010

Go to Step 016 on page 2-19.

011

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

Yes No

012

Go to Step 035 on page 2-21.

013

- Swap the 3299 model another of the same model.

Does the failure still occur?

Yes No

014

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

015

The 3299 input cable is defective.

016

(From step 010)

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

- Disconnect all the output cables from the 3299 port(s).
- Run a wrap test to all (eight) 3299 ports and **stop testing** at the first working port. Use Online Test 10 option 2,xx (00-15).

Note: The port number is the sum of the terminal adapter port number 00 or 08 and the 3299 number 00-07. See "Test 10: Port Wrap Tests" on page 2-166.

- If unable to run online, use the following offline method.
- Perform an Alt 1 IML (see "Alt 2 IML Procedures (Test 82)" on page 1-45) to display the 4001 prompt message. See "How to Load the Test Monitor" on page 2-84.
- Key in **2602** (HG, FN) and press the Advance key.
- Key in the logical port number of the device (00-15), and press Enter.

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

- Use the message on the terminal or the status code on the operator panel to verify the wrap test results for a success or failure. See the *IBM 3174 Status Codes* manual.

Did all eight ports fail the wrap test?

Yes No

017

Reconnect the 3299 output cables. Go to Step 040 on page 2-22.

018

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

Yes No

019

Go to Step 035 on page 2-21.

020

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

Did all eight ports still fail the wrap test?

Yes No

021

Reconnect the 3299 output cables.

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

022

(Step 022 continues)

MAP 0230 (continued)

022 (continued)

- Reconnect the 3299 output cables.
 - Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.
 - The 3299 input cable is defective.
-

023

(From steps 004 and 006)

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

3299 Terminal Multiplexer Wrap Test

- Run the wrap test to the failing 3299 port (run the online test 10 option 2,xx).

Note: The port number is the sum of the terminal adapter port number 00 or 08 and the 3299 number 00-07. See "Test 10: Port Wrap Tests" on page 2-166.

- If unable to run online, use the following offline method.
- Load the Test Monitor to display the 4001 prompt message. See "How to Load the Test Monitor" on page 2-84.
- Key in **2602** (HG, FN) and press the Advance key.
- Key in the logical port number of the device (xx) = 00-15 (FP) and press Enter.

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

- Use the message on the terminal or the status code on the operator panel to verify the wrap test results for a success or failure. See the *IBM 3174 Status Codes* manual.

Does the status code indicate a failure(s)?

Yes No

024

Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

025

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

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

Does the wrap test still fail?

Yes No

026

Reconnect the 3299 output cable(s). Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

027

Is the failing device the only one attached and configured with this 3299-2?

Yes No

028

Reconnect the 3299 output cable(s). Go to Step 040 on page 2-22.

029

(Step **029** continues)

029 (continued)

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

Is the 3299 red indicator on?

Yes No

030

Verify that the power cable is inserted into the 3299 and is also plugged into a powered outlet.
Replace the 3299 with the same model (3299 model 2 or 3).

031

Do you have a spare 3299 that is the same (model 2 or 3)?

Yes No

032

Reconnect the 3299 output cable. Go to Step 035.

033

- Swap the 3299, but do not connect the output cable.
- Run the wrap test again.

Does the failure still occur?

Yes No

034

Reconnect the 3299 output cable.
Perform a normal IML (see “Normal Initial Microcode Load (IML)” on page 1-42) and return the 3174 to operational status.

035

(From steps 012, 019, and 032)

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

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

- Attach the 3299 input cable to a working display or similar device and check for a READY indication. See “How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)” on page 2-247.
- If offline (using the keypad), perform a normal IML (see “Normal Initial Microcode Load (IML)” on page 1-42) to load operational code.

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

Yes No

036

The 3299 input cable is defective.

037

The 3299 is defective. It must be replaced with the same model (3299 model 2 or 3).

(Step 037 continues)

037 (continued)

Does the failure still occur?

Yes No

038

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

039

Further isolation is required. Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

040

(From steps 017 and 028)

- At the 3299, move the failing port's cable to a working port and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-247.
- If offline (using the keypad), perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-42) load the operational code.

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

Is the READY indicator still off?

Yes No

041

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

042

Further isolation is required. Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

MAP 0240: 3299 Model 1 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
<p>Device or devices attached to a 3299 Model 1 (nonwrappable) fail.</p> <p>The 3299 is a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on the 3299 is a customer responsibility. This MAP has been included to help you do subsystem PD when a 3299 is involved.</p>	<ul style="list-style-type: none"> • No AC power to the 3299. • 3299 input and output cables incorrectly connected. • Defective signal cable to 3299 input. • Defective 3299. • The attached device is failing. • The attached device signal cable is failing. • Multiple devices and signal cables.

CAUTION:

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

001

Do you know which device or devices are failing?

Yes No

002

A test 3 summary of the status of all attached devices should be run, or get more information from the customer. See "Test 3: 3270 Device Status Information" on page 2-134. Then continue with Step 003.

003

(From step 002)

Is more than one device failing?

Yes No

004

A single device attached to the same 3299 is failing. Note the failing port number, and go to Step 019 on page 2-25.

005

(Step 005 continues)

005 (continued)

Are all devices that are connected to the same 3299 failing?

Yes No

006

Some devices attached to the same 3299 are failing. Go to Step 028 on page 2-26.

007

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

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

Is the 3299 red indicator on?

Yes No

008

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

009

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

Yes No

010

Go to Step 014.

011

- Swap the 3299 with the spare 3299.

Does the failure still occur?

Yes No

012

Reconnect the 3299 output cables.
Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

013

The 3299 input cable is defective.

- or –

Further isolation is required. Go to Step 031 on page 2-26.

014

(From steps 010 and 024)

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

- Attach the 3299 input cable to a working display or similar device and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-247.
- If offline (using the keypad), perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-42) to load the operational code.

(Step 014 continues)

014 (continued)

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

Yes No

015

The 3299 input cable is defective.

016

Replace the 3299.

Does the failure still occur?

Yes No

017

Reconnect the 3299 cables.

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

018

Further isolation is required. Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

019

(From step 004)

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

Yes No

020

Go to Step 028 on page 2-26.

021

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

Is the 3299 red indicator on?

Yes No

022

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

023

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

Yes No

024

Go to Step 014 on page 2-24

025

– Swap the 3299 with the spare 3299.

(Step 025 continues)

025 (continued)

Does the failure still occur?

Yes No

026

Reconnect the 3299 cables.
Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

027

The 3299 input cable is defective.

Note: Also consider the possibility of a device problem.

Further isolation is required. Go to Step 031.

028

(From steps 006 and 020)

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

- At the 3299, move the failing port's cable to a working port and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-247.
- If offline (using the keypad), perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-42 to load the operational code.

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

Does the READY indicator go on?

Yes No

029

Further isolation is required. Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

030

Replace the 3299.

031

(From steps 013 and 027)

Note: Isolate the failure to the 3299 input cable or to the device(s) and its cable.

- Attach the 3299 input cable to a working display or similar device and check for a READY indication. See "How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)" on page 2-247.
- If offline (using the keypad), perform a normal IML (see "Normal Initial Microcode Load (IML)" on page 1-42) to load the operational code.

(Step 031 continues)

031 (continued)

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

Yes No

032

The 3299 input cable is defective.

033

Further isolation is required. Go to "MAP 0250: Terminal(s) Device(s) Isolation" on page 2-28.

MAP 0250: Terminal(s) Device(s) Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
<p>A device symptom or status code has indicated that a device does not become READY.</p> <p>The device may be a repair center product and is not to be serviced by the on-site CE. Problem determination (PD) on the device is usually a customer responsibility. This MAP has been included to help you do subsystem PD when a device or devices are involved.</p>	<ul style="list-style-type: none"> • The attached device is failing. • The device signal cable is defective. • Defective planar board. • Defective 3299-1, 3299-2, or 3299-3. • 3290 or Personal Computer is attached to port 0. <p>Note: This MAP isolates the device and its signal cable.</p>

CAUTION:

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

001

(From step 002)

If port 0 is the failure, verify that a 3290 is not attached to port 0. If you cannot customize and a Personal Computer (PC) is attached, verify that the PC is in the proper mode that allows controller communication. If the 3174 subsystem is wired via the IBM Cabling System with two or a multiple of two ports failing, consider the possibility of a problem with the cableless twin-balun assembly (which allows connecting two devices to a single wall receptacle).

Has problem determination been done on the attached device?

Yes No

002

Use the attached device documentation to do problem determination on the device. Continue with Step 001.

003

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

Yes No

004

Go to Step 006 on page 2-29.

005

(From step 006)

The problem is isolated to the failing device signal cable.

Note: If the problem is not isolated, then one at a time replace the 3299 Model 2, the planar board, or any part in the failing device(s) configuration.

006

(From step 004)

- Exchange the failing device with a working display or similar device. See “How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)” on page 2-247.
- If offline (using the keypad), perform a normal IML (see “Normal Initial Microcode Load (IML)” on page 1-42) to load the operational code.
 - If the READY condition is on, then the 3174 port location is not at fault and the disconnected device is failing.
 - If the READY condition is off, restore the device and cable and continue with Step 005 on page 2-28.

Note: If the problem is not isolated, then one at a time replace the 3299 Model 2, the planar board or any part in the failing device(s) configuration.

MAP 0300: Host Remote 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
Host communication failure (HG 11, 51, and 52)	<ul style="list-style-type: none"> • Defective Concurrent Communication Adapters (HG 51 and 52) • Defective planar board. • Customizing response. • No AC power to modem. • Defective modem cable. • Incorrect modem cable or wrap plug. • Improperly installed modem cable. • Defective modem. • Communication link failure.

CAUTION:

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

001

– Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-45.

Is 2082 displayed?

Yes No

002

Use the status code. See the *IBM 3174 Status Codes* manual for the repair action.

003

Did the problem occur after the 3174 had been working?

Yes No

004

Perform a normal IML. See “Normal Initial Microcode Load (IML)” on page 1-42. Use Online Test 2 to verify that the customizing response numbers are proper for your 3174 options and host link attachment. See “Test 2: Configuration Menu” on page 2-132. Continue with Step 005.

005

(From step 004)

Is the attachment a Type 1 (V.35) interface? (See Chapter 5 for cable part numbers.)

Yes No

006

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

007

(Step 007 continues)

007 (continued)

- Determine if you have the cable with the one, two or three-switch, Test/Oper switch.
 - Three switch. Set the switch to Test Mode 1 as shown in Table 2-14 on page 2-101.
 - One or two switch. See Figure 2-6 on page 2-101 and do the three steps of the procedure.

(ENTRY POINT A)

- Load the Test Monitor to display the 4001 prompt message. See "How to Load the Test Monitor" on page 2-84.
- To run the cable wrap test, key in **HG01** (HG = 11, 51, or 52) and press Enter.

Is 20HG displayed?

Yes No

008

Press the Advance key to see the extended information from the status code.

Match the code XXHG number to one of the following codes:

02HG (cable or wrap plug not connected)

- Check that the modem cable or wrap plug is plugged into the 3174 planar board.
- Check that the modem cable is the correct part number. See Chapter 5 for cable part numbers.
- Replace the planar board assembly.

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

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

2XHG (cable wrap failure; the planar board assembly, modem cable, or wrap plug is defective or the modem cable or wrap plug P/N being used is incorrect).

- Go to the *IBM 3174 Status Codes* manual, and see code 3030 2XHG. Verify if the 2x code is a cable or wrap plug part number compatibility problem. See Chapter 5 for cable part numbers.
- If you want to isolate the problem to the **planar board assembly** or **cable**, run the wrap test with the wrap plugs. For the part number, see Chapter 5.
- Install the wrap plug, and run the wrap test as previously done in step 007.

009

Is 3174 an EIA/V.35 interface?

Yes No

010

Go to Step 020 on page 2-33.

011

- If you previously did the V.35 wrap test in test mode 1, repeat the wrap test again in test mode 2. See Table 2-14 on page 2-101 and Step 007 in this Map. If you previously did the V.35 wrap test with the one switch, reconnect the interface cable to the short modem cable and continue.
- Set the communication cable Test/Oper switch back to Oper.
- To run the modem status test, key in **HG04** (HG = 11, 51, or 52) and press Enter.

(Step **011** continues)

011 (continued)

Is the status code 4513?

Yes No

012

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

4510 (missing 'data set ready' and 'carrier detect')

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

4511 (missing 'carrier detect' and 'data set ready' is active).

Verify whether your link should be providing the 'carrier detect' signal.

Go to (ENTRY POINT B) in Step 13 of this MAP.

4512 (missing 'data set ready' and active 'carrier detect').

The status test shows that the modem is causing the problem.

– or –

Go to (ENTRY POINT B) in Step 13 of this MAP.

013

The communication adapter card is receiving 'data set ready' and your link is providing the 'carrier detect' signal.

(ENTRY POINT B)

Is the attachment to an IBM modem?

Yes No

014

The modem or the communication link is causing the problem.

015

Is the modem wrappable?

Yes No

016

The modem or the communication link is causing the problem.

017

– The Test/Oper switch is still set to Oper.

– To run the modem wrap test with the modem clock, key in **HG02** (HG = 11, 51, or 52) and press Enter.

(Step 017 continues)

017 (continued)

Is 20HG displayed?

Yes No

018

Status Code 3030

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

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

The 3174 modem wrap test shows a defective modem.

019

– The modem is functioning correctly.

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

– Verify the operational status of the communication network.

020

(From step 010)

– The Test/Oper switch is still set to Test.

– Load the Test Monitor to display the 4001 prompt message. See “How to Load the Test Monitor” on page 2-84.

– To run the cable wrap test with the modem clock, key in **HG05** (HG = 11, 51 or 52) and press Enter.

Is 20HG displayed?

Yes No

021

The modem or its connections are causing the problem.

022

– The wrap testing indicates that the 3174 is functioning correctly and was able to run using the modem clock signal.

– Verify the operational status of the communication network and the other modem signals.

– Verify the communication cable for proper continuity when the switch is in the operate position.

– Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

MAP 0430: File Failures

Symptom Explanation	Conditions That Could Cause This Symptom
File failures-Diskette Drives or Fixed Disk Drive	<ul style="list-style-type: none"> • Diskette media is defective. • Diskette Drives (location 01 or 02) defective. • Fixed Disk Drive (location 03) defective. • Planar board is defective • Storage card (location 22 or 23) defective. (Models 61R, 62R, and 63R only.)

CAUTION:

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

001

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

Yes No

002

- Install the Utility diskette in drive 1 or use the fixed disk if Utility microcode is on the fixed disk.
- Perform basic test on the failing fixed disk (HG03). See "How to Run Hardware Group Basic Tests" on page 2-89.
- If the test completes with a status code of 20HG go to Step 008 on page 2-35.
- If the test completes with a status code of 29HG go to Step 004.
- If the status code is other than 20HG or 29HG, use the *IBM 3174 Status Codes* manual and follow the repair action for that code.

003

- Exchange the diskette in the drive indicated by the HG number.
- Exchange the FRU indicated by TYPE and LOCA, and test again.
- If the failure continues and two diskette drives are present, exchange the other drive with the one just removed in the previous step, and test again.
- If the failure continues, exchange the planar board with a planar board of the same type number.
- If the failure continues, exchange the storage card in location 22 (Models 61R, 62R, and 63R only).
- Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-42.

004

(From step 002)

- Remove the cover and observe the fixed disk drive.
- Feel for any vibrations through the housing to determine if the drive is turning.

Does the drive start and continue to turn?

Yes No

005

Check for bent or broken pins on the board socket that the drive is plugged into.
Measure the voltage to ensure that +12Vdc is present. See Table 1-5 on page 1-41.
(Step 005 continues)

005 (continued)

If connections and power are correct, go to Step 007.

006

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

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

Yes No

007

(From step 005)

Replace the fixed disk.

Perform the Fixed Disk Full Format test (HG 03, FN 33). See "Fixed Disk Drive Full Format (FN 33)" on page 2-93.

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

If the failure continues, exchange the planar board with a planar board of the same type number.

008

(From step 002)

- Replace the operator panel.
- Run the Fixed Disk Defect Fix test (HG 03) (FN 32). See "Fixed Disk Drive Defect Fix (FN 32)" on page 2-92.

Is 4408 displayed?

Yes No

009

Follow the instructions shown for the other completion code.

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

If the failure continues exchange the planar board with a planar board of the same type.

Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-42.

010

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

Replace the fixed disk. Go to Step 007.

Exchange the planar board.

Perform a normal IML and return the controller to the customer. See "Normal Initial Microcode Load (IML)" on page 1-42.

MAP 0600: Token-Ring Network 3174 Isolation

Symptom Explanation	Conditions That Could Cause This Symptom
A status code or symptom is indicating a Token-Ring Network to 3174 Communication problem.	<ul style="list-style-type: none">• Defective Token-Ring adapter card• Defective Token-Ring communication cable.• Improper customizing responses.• IBM Token-Ring Network 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.)

001

- Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-45.

Is 2082 displayed?

Yes No

002

Use the status code. See the *IBM 3174 Status Codes* manual for the repair action.

003

Did the problem occur after the 3174 had been working?

Yes No

004

Perform a normal IML. See “Normal Initial Microcode Load (IML)” on page 1-42. Use Online Test 2 (option 2) to verify that the customizing response numbers are proper for your Token-Ring attachment. See “Test 2: Configuration Menu” on page 2-132. 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.
- Load the Test Monitor to display the 4001 prompt message. See “How to Load the Test Monitor” on page 2-84.

Wrap Test through the IBM 8228 Multistation Access Unit

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

- To run the wrap test, key in **3101** and press Enter.

Is 2031 displayed?

Yes No

006

(Error code = 2931 or 3050). Go to Step 012 on page 2-37.

007

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

- To test the Token-Ring adapter card completely, a wrap plug is needed. This wrap function (02) simulates the loading conditions of the IBM 8228 Multistation Access Unit and checks the card circuitry that selects the relay in the 8228. For the wrap plug part number, see Table 2-17 on page 2-113.

Do you have the wrap plug?

Yes No

008

Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-42.
 Use Online Test 9 to display the Token-Ring Adapter test menu. This menu selects the status of the ring, link, or adapter card. See "Test 9: Display the Token-Ring Test Menu" on page 2-156.
 Check for any status code(s) pertaining to the Token-Ring Network in the event log, run test 1 event log (option 2). See "Test 1: Display Logs Menu" on page 2-126.
 If you find problems with the IBM Token-Ring Network, see the *IBM Token-Ring Network Problem Determination Guide*, SY27-0280.
 Replace the Token-Ring adapter card.

009

- Install the wrap plug into the Token-Ring cable socket at the rear panel.
- Load the Test Monitor to display the 4001 prompt message. See "How to Load the Test Monitor" on page 2-84.
- To run the wrap test, key in **3102** and press Enter.

Is 2031 displayed?

Yes No

010

(Error code = 2931 or 3050).
 Replace the Token-Ring adapter card.
 Check the wrap plug for bent or broken pins.

011

- Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-42.
- Use Online Test 9 which displays the Token-Ring Adapter test menu. This menu selects the status of the ring, link, or adapter card. See "Test 9: Display the Token-Ring Test Menu" on page 2-156.
- Check for any status code(s) pertaining to the Token-Ring in the event log, use Test 1 (option2). See "Test 1: Display Logs Menu" on page 2-126.

If you find problems with the IBM Token-Ring Network, see the *IBM Token-Ring Network Problem Determination Guide*, SY27-0280.

012

(From step 006)

- Leave the 3174 Token-Ring cable connected at the rear panel socket and disconnect the other end of the cable.

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

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

(Step **012** continues)

012 (continued)

Is the cable wrap test failing (status code = 2931 or 3050)?

Yes No

013

Isolate the problem to the 8228 Multistation Access Unit and its cable configuration and connections. See the *IBM Token-Ring Problem Determination Guide*, SY27-0280.

014

- Open the top cover.
- Disconnect the internal cable from the Token-Ring adapter card socket (Loc 04) and then move the Token-Ring communication cable from the rear panel into the card socket.
- Run the wrap test again (3101).

Note: You may be able to get the 4001 prompt message by only pressing Enter.

Is the Cable Wrap Test still failing?

Yes No

015

Repair or replace the 3174 internal cable. See Figure 3-7 on page 3-9.

016

- If you want to isolate the failure to the card or cable, run the wrap test with the wrap plug. For the wrap plug part number, see Table 2-17 on page 2-113.
 - Remove cable at the Token-Ring adapter card and insert the wrap plug.
 - Run the wrap test again (3101).
 - If the wrap test is successful (2031), the communication cable is defective.
 - If the wrap test fails (2931 or 3050), replace the Token-Ring card.
-

MAP 0700: DC Indicator Is Off

Symptom Explanation	Conditions That Could Cause This Symptom
The DC or AC indicator is off.	<ul style="list-style-type: none"> • Power was not switched on. • Power cable is not connected at either end. • Defective power supply. • Incorrect or missing AC input voltage.

DANGER

Line voltages are present within the power supply when the machine is off and the power cord is connected. (For translations of this safety notice, see Safety Notice 8 in *IBM 3174 Safety Notices*, GA27-3824.)

CAUTION:

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

001

– Switch power on.

Is the DC indicator off?

Yes No

002

Return the 3174 to operational status by IMLing with the Control diskette or from the fixed disk.

003

– Press and hold the IML switch, and check the operator panel indicators.

Did all indicators remain off?

Yes No

004

The DC indicator is defective. Replace the power supply.
Continue problem determination. Go to “Initial Symptom Chart” on page 2-5.

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

005

– Check the green AC indicator behind the power supply. See page 3-2. Go to Step 6 if your machine does not have an AC indicator.

(Step 005 continues)

005 (continued)

Is the AC indicator on?

Yes No

006

Switch power off.

Verify that the power cable is inserted into the 3174 power supply receptacle and is also plugged into a working outlet.

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

Check the 3174 power cord for defects.

Replace the power supply.

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

007

Further isolation is required.

Go to "MAP 0710: Power Load Isolation" on page 2-41.

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' line is being held on.	<ul style="list-style-type: none"> • Power supply plug P1 is unplugged. • Defective power supply. • Defective diskette or fixed disk drive. • Defective operator panel assembly. • Defective fan. • Defective planar board. • Defective card location 04, 05.

DANGER

Line voltages are present within the power supply when the machine is off and the power cord is connected. (For translations of this safety notice, see Safety Notice 8 in *IBM 3174 Safety Notices*, GA27-3824.)

CAUTION:

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

001

This MAP should be entered only after you have used "MAP 0700: DC Indicator Is Off" on page 2-39.

– Disconnect the following component cable plugs as a group (see Figure 3-3 on page 3-4):

- Diskette drive 1, plugs SF1-P1 and P3
- Diskette drive 2, plugs SF2-P1 and P4
- Fixed disk drive, plugs J10 and P4
- Planar board, plug P1
- Planar board, plug P6
- Planar board, plug P5.

– Switch power on.

Is the DC indicator still off?

Yes No

002

Switch power off at the controller.

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

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

Note: After powering **off**, wait at least 2 seconds before powering on.

003

(Step 003 continues)

MAP 0710 (continued)

003 (continued)

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

- Switch power off.
- Verify that power supply plug P1 (provides AC line voltage) is plugged into the planar board. See page 3-2.
- Disconnect the power supply cable plug P2.
- To disconnect plug P2, you must remove the deflector. See page 3-2.
- Switch power on.

Is the DC indicator lit?

Yes No

004

Replace the power supply.

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

005

- Switch power off.
- Reconnect the power supply cable plug P2.
- Unseat the logic card(s) in locations 04 and 05. If cards are not installed, go to step 007 of this MAP.
- Switch power on.

Is the DC indicator still off?

Yes No

006

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

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

Note: After powering **off**, wait at least 2 seconds before powering on.

007

A planar board voltage short is indicated; inspect for obvious pin shorts before replacing.

MAP 1000: ASCII Problem Entry

001

You will need the failure information shown below to be directed to the proper MAP. This information may be obtained from the status code with extended information (on the operator panel), from the event log Test 1 (Option 2), or from customer reports.

- For the failing port(s), verify if your status information identifies one item of each of the following steps.

Note: If you have multiple failures, the Port Status Worksheet on page 2-45 may make it easier to compile the status information.

1. Is the failing port(s) connected to a:

- Printer?
- Terminal?
- ASCII Host?

2. Is the failing port(s) attached as a:

- Switched line connection?
- Dedicated line (nonswitched) connection?
- Direct line connection?

3. Is the failing Port(s) Hardware Group equal to:

- HG = 21?

Is any failing status information shown above (items 1, 2, and 3) not known?

Yes No



003

- Run the following online tests to obtain failure information and use the worksheet on page 2-45 that shows a composite summary of the needed information for each port. That worksheet also shows the connection path between a terminal and host. You may want to record the information on another sheet of paper.

The Online test can be run from a 3270 (or equivalent) terminal or any ASCII terminal. (These tests are not selectable from a distributed function terminal, such as a 3290, or from some terminals, such as personal computers. You may have to change the personal computer's mode of operation to communicate with the 3174.)

- Find a working terminal. You will probably be more familiar with the 3270 (or equivalent) terminals to enter test mode and with the key functions to run the tests. Differences between the ASCII terminals and the ASCII emulation mode you are running will require a good knowledge in the use of the terminal key sequence. If needed, see the *3174 Establishment Controller Terminal User's Reference for Expanded Functions*, GA23-0332.
- If the terminals are not in the online mode, the Control and DSL diskettes must be installed and a successful IML must be completed before the tests can be selected. The IML may be done from the fixed disk.
- 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 3270 (or equivalent) terminal, hold the ALT key down while pressing TEST. Press the ENTER key, then select Test 12 (Asynchronous Emulation Adapter Tests). Go to item 5 below.

(Step 003 continues)

003 (continued)

- ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a connection menu displayed. If you have a connection menu, go to item 4 below. If you do not have a connection menu, continue with the following:
 1. At your terminal, switch power off and then on. Press the carriage return (CR) or Enter key. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you may bring up the connection menu (item 4 below) or go through a sequence of either one or two menus shown below (item 2 or 3).
 2. Terminal Type Menu—Type in your terminal emulation selection for your terminal type and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection menu (item 4).
 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. (ASCII terminals usually require pressing the ESC key and then typing in 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. Follow the screen menu selections until the AEA Port Tests menu appears.

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

5. After the 3174 test menu appears on the screen, select the test(s) by following the menu selections:
 - Select the Asynchronous Emulation Adapter Tests menu, Option 2 (Display Status Summary). Verify the screen results. See “Test 12: Asynchronous Emulation Adapter Tests” on page 2-170.
 - Select the 3174 Test Menu and run Test 3 (Display Status Summary) for the host line. Verify that the port(s) having an A on the host line are ASCII terminals. See “Test 3: 3270 Device Status Information” on page 2-134.
 - Select the 3174 Test Menu and run Test 1, Option 2 (All Events Log) and verify the screen results. See “Test 1: Display Logs Menu” on page 2-126. Note the Primary and Connection port numbers for a failing port path.

To identify your terminal/device configuration, use the cabling worksheets (located in the door pocket) or the customer's equivalent cabling configuration.

Port Status Worksheet
Asynchronous Emulation Adapter Ports

HG 21

AEA Ports	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																

Figure 2-1. Port Status Worksheet

Were you *not* able to identify any failing port location(s)?

Yes No

004

Go to Step 007 on page 2-46.

005

You need to get more information defining the problem from the customer. There could be situations when a failure does not indicate a status code. For example, if a terminal user is not able to communicate with an ASCII host, the problem could be the path to the 3174, and thus the 3174 microcode is not aware of the failing inbound path.

You will need information from the customer that defines the connectivity inbound and outbound port paths that are failing. Before seeing the customer, continue in this MAP.

The 3270 (or equivalent) terminal or ASCII terminal that is communicating with a 3270 or ASCII host has three connection-path categories that are possible:

- ASCII terminal to ASCII Host—This path (pass through) uses an AEA port to communicate to a ASCII terminal, and a second AEA port to communicate to the ASCII host.
- 3270 (or equivalent) terminal to ASCII Host—This 3270 terminal, running ASCII emulation, uses a port on the Terminal Adapter/Multiplexer and a port on the AEA card to communicate with the ASCII host.
- ASCII terminal to 3270 host—This ASCII terminal, running 3270 emulation, only uses a port on the AEA card.

(Step 005 continues)

005 (continued)

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

Yes No

006

Go to Step 007 only when you have the needed information.

007

(From steps 002, 004, and 006)

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

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

SYMPTOM	ACTION
All ASCII ports are failing.	Go to "MAP 1010: All ASCII Ports Are Failing" on page 2-47.
ASCII Direct attached port(s)—any failing combination.	Go to "MAP 1020: Direct Connection Port—Any Failure" on page 2-49.
ASCII Leased line (nonswitched) port(s)—any failing combination.	Go to "MAP 1030: Nonswitched Connection Port—Any Failure" on page 2-56.
ASCII Switched line port(s)—any failing combination.	Go to "MAP 1040: Switched Connect Ports—Any Failure" on page 2-64.
3278 terminal type customized to communicate to ASCII Host—Any failing combination.	Go to "MAP 1050: 3278 (or Equivalent) Terminal Failing to Communicate to ASCII Host" on page 2-78.

MAP 1010: All ASCII Ports Are Failing

Symptom Explanation	Conditions That Could Cause This Symptom
All attached ASCII Terminals/Devices are failing.	<ul style="list-style-type: none"> • Logic card (location 04) defective. • Loose cable connectors. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings • Open or shorted wires in communication cables.

CAUTION:

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

001

– Perform an Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-45.

Is 2082 displayed?

Yes No



002

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

003

Did the problem occur after the 3174 had been working?

Yes No



004

Ask the customer to verify the 3174 customizing questions and the known failing device(s) setup parameters for this feature.
If you still have a problem, continue with step 005 in this MAP.

005

The Online test should be run from a 3270 (or equivalent) terminal. (These tests are not selectable from a distributed function terminal, such as a 3290, or from some terminals, such as personal computers. You may have to change the personal computer’s mode of operation to communicate with the 3174.) The IML may be done from the fixed disk.

- If the terminals are not in the Online mode, the Control and DSL diskette must be installed and a successful IML must be completed before the tests can be selected.
- Log off the current customer application.
- Use the AEA wrap plug (P/N 61X4602) that is shipped with the 3174. Install the wrap plug on the proper I/O panel hardware group (21) connector (0-7).
- To enter test mode at the 3270 (or equivalent) terminal, press and hold the ALT key and press the TEST key; then press the ENTER key. Select Test 12, and then Option 1 (AEA Port Test Menu).
- After the AEA Port Test Menu appears on the screen, enter Option 2 with the port and hardware group information. Press the ENTER key. The following test wraps data to check the driver-to-receiver signal path at the I/O panel with the wrap plug installed on the I/O panel.

The first part of the test wraps the EIA control lines except, the transmit and receive lines. A ready message (READY) or an error code (xxxx) is displayed at the implementing terminal screen.

(Step 005 continues)

005 (continued)

Did the **READY** message appear on top of the screen?

Yes No

006

Replace the AEA card in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the Input/Output panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

007

The second part of the test wraps the transmit and receive signal lines.

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

Were all the characters displayed as expected?

Yes No

008

Replace the AEA card in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

009

– Remove the wrap plug and reinstall the cable.

- If this is a new installation, verify that the communication cables are at the proper 3174 ports and host/terminal destinations.
- If this is a new installation, verify that the proper communication cable is being used. (Direct cable wiring crosses over to different pins at the host/terminal end.) See Figure 2-11 on page 2-107. Switched and nonswitched cable wiring is the same at each cable end (no crossover of wires). See Figure 2-10 on page 2-106.
- If this is a new installation, return to the 3174 Test Menu, select Test 12 (Asynchronous Emulation Adapter Tests), then select Option 2 (Display Status Summary). Check that the port is direct, and that the Station line (v p h) agrees with customizing.

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

- Check for communication cable defects.

Switched and Nonswitched cables—The wrap test through the cable can be run if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs. See Figure 2-10 on page 2-106.

Direct cables—To do a wrap test through the cable will require the insertion of the EIA Interface Monitor (breakout box) at the end of the cable. The breakout box must then be jumpered to match the wrap plug wiring. The cable connector may also require the insertion of the gender connector at the breakout box. The breakout box is P/N 453637. See Figure 2-11 on page 2-107.

- Use your support structure for aid.

MAP 1020: Direct Connection Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host through its direct cable path (no modem) to a 3174 port is having a problem.	<ul style="list-style-type: none"> • Logic card (location 04) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective terminal. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings • Cable problems due to excessive noise.

CAUTION:

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

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The external equipment and their attached cables, are the responsibility of the customer and are not to be serviced by the on-site customer engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

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

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

The online test can be run from a 3270 (or equivalent) terminal or any ASCII terminal. (These tests are not selectable from a distributed function terminal, such as a 3290, or from some terminals, such as personal computers. You may have to change the personal computer's mode of operation to communicate with the 3174.)

Find a working display terminal. You will probably be more familiar with the 3270 (or equivalent) terminals to enter test mode and with the key functions to run the tests. Differences between the ASCII terminals and the ASCII emulation mode you are running will require a good knowledge in the use of the terminal key sequence. If needed, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

- If the terminals are not in the online mode, the Control and DSL diskettes must be installed and a successful IML must be completed before the tests can be selected. The IML may be done from the fixed disk.
- Log off the current customer application.

Use the AEA Wrap Plug (P/N 61X4602) that is shipped with the 3174 and **install the wrap plug** on the proper I/O panel hardware group (21) connector (0-7)).

- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:
 - 3270 Procedure—At the 3270 (or equivalent) terminal, hold down the ALT key while pressing TEST. Press the ENTER key, select Test 12 (Asynchronous Emulation Adapter Tests), and then Option 1 (AEA Port Test Menu). Go to item 6 below.
 - ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a connection menu displayed. If you have a connection menu, go to item 4 below. If you do not have a connection menu, continue with item 1.

1. At your terminal, switch power off and then on. Press the carriage return (CR) or Enter key. The 3174 should bring up a connection sequence. Depending on the 3174 customizing, you may bring up the connection menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).
2. Terminal Type Menu—Type in your terminal emulation selection for the terminal you are running from, and press the CR or ENTER key. The 3174 should then respond with the Use Specific Keyboard MAP (item 3) or the Connection menu (item 4).
3. Keyboard MAP menu—Key in the requested information and press the CR or ENTER key. The 3174 should then respond with the Connection Menu.
4. Connection menu—Enter test mode for your terminal. (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.

The following test wraps data to check the driver-to-receiver signal path at the I/O panel with the wrap plug installed on the I/O panel.

The first part of the test wraps the EIA control lines except the transmit and receive lines. A ready message (READY) or an error 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 in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

003

The second part of the test wraps the transmit and receive signal lines.

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

Were all the characters displayed as expected?

Yes No

004

Replace the AEA card in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

005

- Return to the AEA Port Tests menu and do the following for your terminal type.

- 3270 terminal type—Perform the ALT and TEST key function two times.

- ASCII terminal type—Use the Menu Request sequence to return to the AEA Port Tests menu. Try pressing ESC, then hold CTL while pressing the H key. If this does not work, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

– Remove the wrap plug and reinstall the communication cable.

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

Yes No

006

(Port is attached to an ASCII host.)

Go to Step 014 on page 2-52.

007

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. The tested terminal should be able to enter characters and the same characters should then be displayed at your terminal.

Run the following default transmit test (Option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.

- Add the port and hardware group information to Option 3 (this will cause the default settings to be used) and press CR or the ENTER key.
- Type in a string of characters and verify the proper results at the tested device. (The characters are not displayed at your terminal.)

Did the other terminal/printer show the proper characters?

Yes No

008

Go to Step 021 on page 2-53.

009

The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

- 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

010

Go to Step 021 on page 2-53.

011

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

1. Reenter test mode; select Test 12, Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See Step 005.)
2. Check the ASCII port for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-20.

3. Check for any pending status code(s) in the event log. (From the 3174 Test Menu, select Test 1, Display Event Logs and Response Time Log; then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-126.
4. Determine if this is the customer problem.

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

- Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes No

012

To continue problem isolation, you need the host connectivity path port number, and the hardware group the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.
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 2-43.

014

(From step 006)

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

Yes No

015

Ask the customer to verify the 3174 customizing questions and the known failing device(s) setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. 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 at the proper 3174 port and is routed to the proper host destination.
3. If this is a new installation, verify that the proper communication cable is being used. (The cable wiring crosses over to different pins at the host communication end.) See Figure 2-11 on page 2-107.

(Step 017 continues)

017 (continued)

4. If this is a new installation, return to the 3174 Test Menu. Select Test 12, Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.) Check that the port is direct, and the Station line (v p h) agrees with customizing.

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

5. Check for communication cable defects. To do a wrap test through the cable will require the insertion of the EIA Interface Monitor (breakout box; P/N 453637) at the end of the cable. This allows the cable plug to be jumpered to match the wrap plug wiring. The male wrap plug may also require the insertion of a gender conversion connector that would then allow the proper mating of the male wrap plug. The gender conversion connector can be obtained from vendor catalogs.

018

1. Reenter test mode, select Test 12, Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the ASCII port line for excessive cable errors. These errors are counted by the cable counter. If the cable counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any pending status code(s) in the event log. (From the 3174 Test Menu, select Test 1, then select Option 2.) See "Test 1: Display Logs Menu" on page 2-126 and "3174 Event Log" on page 1-20.
4. Determine if this is the customer problem.
5. Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment parameters for EIA 232D require a cable between 1 meter (3 feet) and 15 meters (50 feet) and a line speed of 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 2-43.

021

(From steps 008 and 010)

Did the problem occur during customizing or installation?

Yes No

022

Go to Step 017 on page 2-52.

023

The problem could be either 3174 customizing, device setup parameters, a communication cable, or the failing device.

You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, stop bits, and the same operation condition for the attached failing device. 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*, GA23-0214, for the meaning of these values.

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

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

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

Note: The 3174 does not support BLOCK operating mode and only supports 7 data bits as the data word length.

See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. Verify your terminal setup options.

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

Did you find a mismatch between terminal setup and customizing?

Yes No

024

(Step 024 continues)

024 (continued)

Ask the customer to verify the other 3174 customizing questions and the known failing device(s)' other setup parameters for this feature. See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. Verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-52.

025

1. Return to the AEA Port Tests menu.
2. See the chart below and find the W, X, YY, ZZ number that you should enter for these parameters.

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19200 bps	7						

3. Add the port, hardware group, and override option parameters, and press the CR or ENTER key. You should then get a READY message.
4. Type in a string of characters and verify the proper results at the tested device. **Characters will not be displayed at your terminal.**

Did the terminal/printer show the proper characters?

Yes No

026

Go to Step 017 on page 2-52.

027

Note: The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.

MAP 1030: Nonswitched Connection Port—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host, connected through a leased or nonswitched line to a 3174 port is having a problem.	<ul style="list-style-type: none"> • Logic card (location 04) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective modem. • Defective terminal. • Incorrect 3174 customizing. • Incorrect terminal/device setup settings • Cable problems due to excessive noise. • Communication line noise. • ASCII Host.

CAUTION:

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

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The external equipment and their attached cables are the responsibility of the customer and are not to be serviced by the on-site customer engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

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

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

- The online tests can be run from a 3270 (or equivalent) terminal or any ASCII terminal. (These tests are not selectable from a distributed function terminal, such as a 3290, or from some terminals, such as personal computers. You may have to change the personal computer's mode of operation to communicate with the 3174.)
- Find a working terminal. You will probably be more familiar with the 3270 (or equivalent) terminals to enter test mode and with the key functions to run the tests. Differences between the ASCII terminals and the ASCII emulation mode you are running will require a good knowledge in the use of the terminal key sequence. If needed, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.
- If the terminals are not in the online mode, the Control and DSL diskettes must be installed and a successful IML must be completed before the tests can be selected. The IML may be done from the fixed disk.
- Log off the current customer application.

Use the AEA Wrap Plug (P/N 61X4602) that is shipped with the 3174 and **install the wrap plug** on the proper I/O panel hardware group (21) connector (0-7).

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

(Step 001 continues)

001 (continued)

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

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

The following test wraps data to check the driver-to-receiver signal path at the I/O panel with the wrap plug installed on the I/O panel.

The first part of the test wraps the EIA control lines except the transmit and receive lines. A ready message (READY) or an error 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 in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

003

The second part of the test wraps the transmit and receive signal lines.

- Type in a string of characters. If 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 in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

005

– Return to the AEA Port Tests menu by doing the following:

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

– Remove the wrap plug and reinstall the communication cable.

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

Yes No

006

(Port is attached to an ASCII host.) Go to Step 014 on page 2-59.

007

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. The tested terminal should be able to enter characters and the same characters should then be displayed at your terminal.

Run the following default transmit test (option 3). This option uses the 3174 customizing parameters that apply to the operating condition for the attached device. For this test to be successful, the parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.

- Add the port and hardware group information to option 3 (this will cause the default settings to be used) and press the CR or ENTER key.
- Type in a string of characters and verify the proper results at the tested device. (Characters are not displayed at your terminal.)

Did the other terminal/printer show the proper characters?

Yes No

008

Go to Step 021 on page 2-61.

009

The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

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

(Step 009 continues)

009 (continued)

Did your terminal show the proper characters?

Yes No

010

Go to Step 021 on page 2-61.

011

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

1. Reenter test mode, select Test 12 Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the ASCII port for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time. See "3174 Event Log" on page 1-20.
3. Check for any pending status code(s) in the event log. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-126.
4. Determine if this is the customer problem.

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

- Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes No

012

To continue problem isolation, you need the host connectivity path port number, and the hardware group the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.

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 2-43.

014

(From step 006)

(Step 014 continues)

014 (continued)

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

Yes No

015

Ask the customer to verify the 3174 customizing questions and this feature's setup parameters for the known failing device(s). See the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. Verify your terminal setup options.

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

016

(From step 015)

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

Were you able to communicate with the host?

Yes No

017

(From steps 022, 024, and 026)

- Verify that the 3174 communication cable is securely connected at each cable end.
- If this is a new installation, verify that the communication cable is at 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 Figure 2-10 on page 2-106.
- If this is a new installation, return to the 3174 Test Menu. Select Test 12 Option 2 (Display Status Summary). (From an ASCII terminal, use the Menu Request sequence as previously done in step 005.) Check that the port is nonswitched, and that the Station line (v p h) agrees with customizing.

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

- Check for communication cable defects. See Figure 2-10 on page 2-106.

Note: The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.

- If this is a new installation and a limited-distance modem is attached to the 3174, check the unit for any switches that may need to be set (for example, DCE or DTE). The telephone wiring that connects the modems may also be the cause of the problem.
- If the attachment is through a modem, ask 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 2-247.
- Use your support structure for aid.

018

1. Reenter test mode, select Test 12 Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See Step 005.)

2. Check the ASCII port line for excessive cable errors. These errors are counted by the cable counter and if the cable counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any pending status code(s) in the event log. From the 3174 Test Menu, Select Test 1, then Option 2 (All Events Logged). See "Test 1: Display Logs Menu" on page 2-126 and "3174 Event Log" on page 1-20.
4. Determine if this is the customer problem.

Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

The customer supplies the external cables from the 3174 to the communication equipment. It is recommended that the customer select shielded cables. The attachment parameters for EIA 232D require a cable between 1 meter (3 feet) and 15 meters (50 feet) and a line speed of 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 2-43.

021

(From steps 008 and 010)

Did the problem occur during customizing or installation?

Yes No

022

Go to Step 017 on page 2-60.

023

The problem could be either 3174 customizing, device setup parameters, communication cable, or the failing device.

You need to verify the 3174 customizing responses that relate to the speed, parity, flow control, stop bits, and the same operating condition for the attached failing device. 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*, GA23-0214, for the meaning of these values.

Table 2-4. Customizing Questions			
Transmit Test Setting	Customize Question	Function	3174 Response Number = xx
W	733	Line Speed	----
X	735	Parity	----
YY	731	Flow Control	----
ZZ	736	Stop Bits	----

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

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

Note: The 3174 does not support BLOCK operating mode and only supports 7 data bits as the data word length.

See the *3174 Terminal User’s Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

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

Did you find a mismatch between terminal setup and customizing?

Yes No

024

Ask the customer to verify the other 3174 customizing questions and the known failing device(s)’ other setup parameters for this feature. See the *3174 Terminal User’s Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. Verify your terminal setup options.

If customizing is not the problem, go to Step 017 on page 2-60.

025

1. Return to the AEA Port Tests menu.
2. See the chart below and find the W, X, YY, ZZ number that you should enter for these parameters.

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19200 bps	7						

3. Add the port, hardware group, and override option parameters, and press the CR or ENTER key. You should then get a READY message.
4. Type in a string of characters and verify the proper results at the tested device. (Characters are not displayed at your terminal.)

Did the terminal/printer show the proper characters?

Yes No

026

Go to Step 017 on page 2-60.

027

Note: The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.

MAP 1040: Switched Connect Ports—Any Failure

Symptom Explanation	Conditions That Could Cause This Symptom
A Terminal/Device or ASCII Host, connected through a switched line to a 3174 port is having a problem.	<ul style="list-style-type: none">• Logic card (location 04) defective.• Open or shorted wires in communication cable.• Loose connections at the cable connectors.• Defective modem(s).• Defective data phone(s).• Defective terminal.• Incorrect 3174 customizing.• Incorrect terminal/device setup settings.• Communication line noise.• ASCII host.• Telephone line network.

CAUTION:

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

001

Note: Problem determination is normally limited to the isolation procedures in the 3174. The attached equipment and cables are the responsibility of the customer and are not to be serviced by the on-site customer engineer unless designated by the IBM Maintenance Agreement. The MAP procedures that are used to isolate problems beyond the I/O connector(s) have been included to help you, when IBM has been asked to provide assistance.

Find out from the customer how many users are dialing into this failing port(s) location. Also find out how many are failing. Find out from the host system operator if other equipment and its users are also having problems with this host.

If the host users are having problems only with the 3174 host attachment, continue with this MAP. The online test can be run from a 3270 (or equivalent) terminal or any ASCII terminal. (These tests are not selectable from a distributed function terminal, such as a 3290, or from some terminals, such as personal computers. You may have to change the personal computer's mode of operation to communicate with the 3174.)

Find a working terminal. You will probably be more familiar with the 3270 (or equivalent) terminals to enter test mode and with the key functions to run the tests. Differences between the ASCII terminals and the ASCII emulation mode you are running will require a good knowledge in the use of the terminal key sequence. If needed, see the *3174 Terminal User's Reference for Expanded Functions*, GA23-0332.

- If the terminals are not in the online mode, the Control and DSL diskette must be installed and a successful IML must be completed before the tests can be selected. The IML may be done from the fixed disk.
- Log off the current customer application.
- Use the AEA Wrap Plug (P/N 61X4602) that is shipped with the 3174 and **install the wrap plug** on the proper I/O panel hardware group (21) connector (0-7).
- Use one of the following procedures, depending on the type of terminal, to enter test mode and select the AEA Port Test Menu:
 - 3270 Procedure—At the 3270 (or equivalent) terminal, hold down the ALT key while pressing TEST. Press the ENTER key, select Test 12 Option 1. Go to item 6 below.

(Step 001 continues)

001 (continued)

- ASCII Procedure—Before you can enter test mode, your ASCII terminal must have a Connection Menu displayed. If you have a Connection Menu, go to item 4 below. If you do not have a Connection Menu, continue with the following:
 1. At your terminal, switch power off and then on. Press the carriage return (CR) or Enter key. The 3174 should then bring up a connection sequence. Depending on the 3174 customizing, you may bring up the Connection Menu (item 4 below) or go through a sequence of either one or two menus as shown below (item 2 or 3).
 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.

The following test wraps data to check the driver-to-receiver signal path at the I/O panel with the wrap plug installed on the I/O panel.

The first part of the test wraps the EIA control lines except the transmit and receive lines. A ready message (READY) or an error 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 in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

003

The second part of the test wraps the transmit and receive signal lines.

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

Were all the characters displayed as expected?

Yes No

004

Replace the AEA card in logic card location 04. See Figure 3-3 on page 3-4 and "Removal/Replacement Procedures" on page 3-6.

If the wrap still fails, check that the I/O panel cable is properly inserted into the planar board. Also check for any damaged socket pins.

005

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

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

Yes No

006

(Port is attached to an ASCII host.)
Go to Step 030 on page 2-73.

007

The problem could be either the local modem, remote modem, modem cables, phone line, phones, terminal, or the terminal's cable.

The procedures are written for the IBM 5841/2, and Hayes¹ or other modems that support the AT command set. When the attachment is Micom² or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation. The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.

Are the modems the IBM 5841/2, Hayes, or similar smart-modems?

Yes No

008

If you do not have a smart-modem, see the manufacturer's documentation for problem isolation. If you have a Micom or compatible modem, see the manufacturer's documentation for those MAP steps that require references. Go to Step 009.

009

(From step 008)

1. You should have the port test menu displayed.
2. Select the Transmit test option (default settings). This selection allows the 3174 to send and receive data from the smart-modem. The AT command and data that follows in this MAP sequence will then initiate a switched line connection for this port.
3. Add the port and hardware group information to Option 3 (default settings) and press the CR or ENTER key.
4. After you get the READY message, type in a string of different characters. The modem should echo the same characters back to your terminal.

(Step 009 continues)

¹ Trademark of Hayes Microcomputer Products, Inc.

² Trademark of Micom Systems, Inc.

009 (continued)

Were the READY message and the proper characters displayed?

Yes No

010

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

- Verify that the local modem has power by checking for any lit indicators.
- Verify that the modem's communication cable is securely connected at each cable end.
- Reset the local modem by switching the modem power off and then on.
- If this is a new installation, verify that the communication cable is at the proper 3174 port and is routed to the proper smart-modem destination.
- If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals are the same at each cable end.) See Figure 2-10 on page 2-106.
- If this is a new installation, verify that the smart-modem transmission speed agrees with the 3174 customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *Customizing Guide* response numbers 733 and 734, and verify the responses. Select the Asynchronous Emulation Adapter Tests menu, 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 is routed 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 2-247.
- Check for communication cable defects.

Note: The wrap test through the cable can be run if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.

- If the modem is IBM, you may be able to isolate by running the modem self test. See its guide. The Hayes modem can only be tested from a working 3174 or a terminal. If Modem Self testing is not available, tell the customer that the modem may be defective.

011

The following test requires you to enter the phone number of the remote modem's phone. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, will cause the remote phone/modem to ring and then establish a connection path to the remote terminal. The local modem will then show the DTR, DSR, and CD (IBM), or MR, TR, and CD (Hayes) indicators in the on condition.

The format for dialing with the AT command is shown below. If additional command information and examples are needed, see the modem documentation.

Command	Description
ATD	Puts smart-modem in dial function mode.
T	Tone dialing.
P	Pulse dialing.
,	If the access code has a number (usually the number 9), then add a comma after the number. This will allow a pause for the second dial tone. Each comma is a pause for 2 seconds.
—	The hyphen can be used to denote breaks between numbers.
;	After dialing, 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 and hold the Shift key, type in **ATD**.
- Type in the remote modem's phone number after the ATD characters (for example, **ATD9,,xxx-xxxx**) and press the CR or ENTER key. Within about 45 seconds, your terminal will display either a CONNECT or NO CARRIER message.

Did you get the CONNECT message?

Yes No

012

(NO CARRIER or ERROR message)

Note: If a terminal/device is connected to the remote modem, the power must be on the terminal/device for the connection sequence to be successful.

Reset the local modem by switching power off and then on.

Retry the connection again; enter the dial sequence as described in the above step.

You may be able to isolate your connection problem by listening to the modem speaker. The following is the sequence of events at the local modem after you enter the dial sequence.

1. Dial tone.
 2. Dialing tones or clicks.
 3. Ringing or busy or fast busy. To establish a connection, the remote modem must have DTR, DSR, and CD (IBM), or CD, TR, and MR (Hayes) indicators on. Also check for the correct phone number for the remote modem.
 4. Access time for the phone connection.
 - Connection—Wavering tone, then carrier indicator comes on at the local modem.
 - No connection—Operator voice to indicate wrong number or other information. Rings and no answer.
1. Use one or more of the following methods to check your phone communication line:
 - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
 - Use your local modem phone to dial another phone number whereby the other phone can be answered.
 - If a phone is not connected, have someone dial your location and listen for the rings at the local smart-modem speaker.
 2. If you are **not able** to talk to the other person, hear the rings, or the tone at the modem, then go to step 4 below. If you are **able** to talk to the other person or hear the rings or the tone at the modem, do only step 3.

(Step 012 continues)

012 (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*.

The modem front panel switches can run a data wrap to the remote modem and back to the local modem. Do the Remote Digital Loop Self Test.

- Hayes modem—See the manufacturer's documentation.

The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested by doing a self test from a terminal attached to the remote modem.

4. The problem is most likely from your local modem to the phone line.
 - Verify the phone wire and connections from the modem to telephone data jack.
 - Notify the customer that the modem may be defective.

013

This test allows data to be sent from the requesting terminal to another terminal/printer and must be visually inspected at the tested device for the correct characters. The characters are not shown at your terminal. **Because of the potential distance of the tested device, it will be necessary to contact another person to verify the test results.** The tested terminal at the remote modem end should be able to enter characters and these same characters should then be displayed at your terminal.

For this test to be successful, the 3174 customizing response parameters for line speed, parity, stop bits, and line flow must be correct and must match between the 3174 and the attached device.

- Type in a string of characters and verify the proper results at the tested device. (Characters are not displayed at your terminal.)

Did the other terminal/printer show the proper characters?

Yes No

014

Go to Step 020 on page 2-70.

015

The tested terminal at the remote modem end should be able to enter characters, and these same characters should then be displayed at your terminal.

- 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 2-70.

017

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

1. Reenter test mode; select Test 12 Option 2 Status Summary. (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the ASCII port line for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
3. Check for any pending status code(s) in the event log. (From the 3174 Test Menu, select Test 1, then select Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-126.
4. Determine if this is the customer problem.

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

- Verify that the customer did not change 3174 customizing parameters, device setup settings, host application, or host data stream list for special features.

Was the problem isolated?

Yes No

018

To continue problem isolation, you need the host connectivity path port number, and hardware group that the terminal is communicating with. If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.
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 2-43.

020

(From steps 014 and 016)

Did the problem occur during customizing or installation?

Yes No

021

Go to Step 027 on page 2-72.

022

The problem could be either 3174 customizing, device setup parameters, a communication cable, or the failing device.

You need to verify that the 3174 customizing responses that relate to the speed, parity, flow control, and stop bits are the same operating condition for the attached failing device. 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).

(Step 022 continues)

022 (continued)

- Find the following customizing responses and record their values for response number = xx in the following chart. See the 3174 *Plannning Guide*, GA23-0214, for the meaning of these values.

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

Your device type may have the ability to display a setup menu with the operating options that were set. These options must be correct and must match the 3174.

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

Note: The 3174 does not support BLOCK. operating mode and only supports 7 DATA BITS as the data word length.

See the 3174 *Terminal User’s Reference for Expanded Functions*, GA23-0332. Verify your terminal setup options.

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

Did you find a mismatch between terminal setup and customizing?

Yes No

023

Ask the customer to verify the other 3174 customizing questions and this feature’s other setup parameters of the known failing device(s). See the 3174 *Terminal User’s Reference for Expanded Functions*, GA23-0332, for information on terminal switch settings. Verify your terminal setup options. If customizing is not the problem, go to Step 027 on page 2-72.

024

Note: To do the override option, it is necessary to go back to the AEA Port Tests menu. When returning to the menu, the switched line connection is dropped and the connection sequence must be done again after you enter the proper transmit test parameters.

1. Return to the AEA Port Tests menu.
2. See the chart below and find the W, X, YY, ZZ number that you should enter for these parameters.

Line Speed	W	Parity	X	Flow Control	YY	Stop Bits	ZZ
Auto Baud/Parity	0	Auto	0	None	00	1 Stop Bit	00
300 bps	1	Mark	1	CTS	10	2 Stop Bits	01
600 bps	2	Space	2	DTR	20		
1200 bps	3	Even	3	XON/XOFF	80		
2400 bps	4	Odd	4				
4800 bps	5	None	7				
9600 bps	6						
19200 bps	7						

(Step 024 continues)

024 (continued)

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 entering the upper case ATD characters and then the phone number information. The proper connection should return with a CONNECT message.
5. Type in a string of characters and check for the proper results at the tested device. (Characters are not displayed at your terminal.)

Did the terminal or printer show the proper characters?

Yes No

025

The smart-modems have a large number of switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup option settings can be checked or changed via the use of the AT commands. The local modem settings can be set from a 3174 terminal. If this 3174 has been newly installed, you need to check the modem options. See "Modem Specifications and Switch Settings" on page 2-247 for the specific parameter recommendations. Also see the manufacturer's documentation for the command parameters.

Go to Step 027.

026

Note: The tested terminal at the remote modem end should be able to enter characters, and these same characters should then be displayed at your terminal.

If needed, return to "MAP 1000: ASCII Problem Entry" on page 2-43.

027

(From steps 021, 023, and 025)

This modem test takes the incoming transmitted data from the 3174 and the data is read back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is Hayes, disconnect the telephone jack from the local modem or the wall plug.
2. Reset the local modem by switching power off and then on.
3. Return to the AEA Port Tests menu.
4. Add the port and hardware group information to option 3 (default settings). For ASCII terminals, press the CR or ENTER key.
5. When you get the READY message, press and hold 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, press and hold the Shift key and type in **ATS16 = 0**.

Were the proper message and characters displayed at your terminal?

Yes No

028

(Step 028 continues)

028 (continued)

Reinstall the telephone jack if it was disconnected.
Tell the customer that the modem may be defective.

029

– From the following, select the one that applies to your modem:
IBM modem—See the 5841/5842 *Guide to Operations*.

- 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 from the attached terminal.

– Reset the local modem before returning to the online system.

030

(From step 006)

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

Yes No

031

Ask the customer to verify the 3174 customizing questions and the known failing device setup parameters for this feature.

Go to Step 032.

032

(From step 031)

The problem could be either the local modem, remote modem, modem cables, phone line, phones, or the 3174 customizing.

The procedures are written for the IBM 5841/2, and Hayes or other modems that support the AT command set. When the attachment is Micom or a similar modem, the AT commands used in this MAP need to be converted to the similar command function for those modems. See the manufacturer's documentation.

The MAP also uses decisions based on the conditions of the indicators found on the IBM and Hayes modems.

Are the modems the IBM 5841/2, Hayes, or similar smart-modems?

Yes No

033

If you do not have a smart-modem, then see the manufacturer's documentation for problem isolation. If you have a Micom or compatible modem, see the manufacturer's documentation when the MAP steps require reference. Go to Step 034.

034

(From step 033)

– If needed, enter test mode and follow the screen menu selections until the AEA Port Tests menu appears.

- Select Option 3, Transmit Data (Default Options) as shown in the following steps:
 1. Add the port and hardware group information to Option 3 (Default Settings) and press the CR or ENTER key (ASCII).
 2. After you get the READY message, type in a sequence of different characters. These same characters should echo back to your terminal.

Were the READY message and the proper characters displayed?

Yes No

035

The missing READY indicates that the AEA card port did not properly communicate with the attached local modem. When this happens, the IBM modem DTR or the Hayes TR indicator will not come on.

Note: When actions are performed in the following steps, return to the AEA Port Tests menu and repeat the transmit test to check for the READY message.

1. Verify that the local modem has power by checking for any lit indicators.
 2. Verify that the local modem's communication cable is properly connected at each cable end.
 3. If this is a new installation, verify that the proper communication cable is being used. (The cable lead signals should be the same at each cable end.) See Figure 2-10 on page 2-106.
 4. If this is a new installation, verify that the smart-modem transmission speed agrees with the 3174 customizing responses. Return to the 3174 Test Menu and select Test 2 (Display Configuration Panels). See *Customizing Guide* response numbers 733 and 734, and verify the responses. Select the Asynchronous Emulation Adapter Tests menu, 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 is routed 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 2-247.
 6. Reset the local modem by switching the modem power off and then on.
 7. Check for communication cable defects. See Figure 2-10 on page 2-106.
- Note:** The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.
8. If the modem is IBM, you may be able to isolate the problem by running the modem self test. See its guide. The Hayes modem can only be tested from a working 3174 or a terminal. If modem self testing is not available, tell the customer that the modem may be defective.
 9. Use your support structure for aid.

036

This modem test takes the incoming transmitted data from the 3174 and the data is read back through the modem. If the test is successful, the typed-in data is shown at your terminal.

1. If your modem is Hayes, disconnect the telephone jack from the local modem or the wall plug.
2. Press and hold the Shift key and type in **ATS16=1**, 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.

(Step 036 continues)

036 (continued)

Were the proper message and characters displayed at your terminal?

Yes No

037

Verify that the local modem switch settings are properly set for attachment to the 3174. See "Modem Specifications and Switch Settings" on page 2-247.

Check for communication cable defects. See Figure 2-10 on page 2-106.

Note: The wrap test can be run through the cable if you are able to get a gender conversion connector for the wrap plug. This connector will allow the mating of the male wrap plug with the male cable connector. This item can be ordered from vendor catalogs.

Reinstall the telephone jack if it was disconnected.

Ask the customer that the local modem may be defective.

038

— Reinstall the telephone jack if it was disconnected.

The following test requires you to enter the phone number of the remote modem's phone. Get the phone number from the 3174 worksheets (located inside the 3174 door pocket) or check with the customer. This test, if successful, will cause the remote phone/modem to ring and then establish a connection path to the remote ASCII host. The local modem will then show the DTR, DSR, and CD (IBM), or MP, TR, and CD (Hayes) indicators in the on condition.

The format for dialing with the AT command is shown below. If additional command information and examples are needed, see the modem documentation.

COMMAND	DESCRIPTION
ATD	Puts smart-modem in dial function mode
T	Tone dialing
P	Pulse dialing
,	If the access code has a number (usually the number 9), then add a comma after the number. This will allow a pause for the second dial tone. Each comma is a pause for 2 seconds.
—	The hyphen can be used to denote breaks between numbers.
;	After dialing, the semicolon allows the modem to go back to command mode. (Sometimes other access information is entered and then the connection can be completed.)

— Press and hold the Shift key and type in **ATD**.

— Type in the remote modem's phone number after the ATD characters (for example, ATD9,,xxx-xxxx), and press the CR or ENTER key (ASCII). Within about 45 seconds, your terminal will indicate either a CONNECT or NO CARRIER message.

Did you get the CONNECT message?

Yes No

039

(NO CARRIER message)

Retry the dial sequence a few times.

You may be able to isolate your connection problem by listening to the modem speaker. The following is the sequence of events at the local modem speaker.

(Step 039 continues)

039 (continued)

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.
5. **Continue** the MAP flow if needed.
 1. Use one or more of the following methods to check your phone communication line:
 - From another phone, dial your local modem's number and verify that a tone is heard after the first ring.
 - Use your local modem phone to dial another phone number whereby the other phone can be answered.
 - If a phone is not connected, have someone dial your location and listen for the rings at the local smart-modem speaker.
 2. If you are **not able** to talk to the other person, hear the rings or the tone at the modem, then verify the phone wire and connections from the modem to the wall data jack.

If you are **able** to talk to the other person, hear the rings or the tone at the modem, do only item 3.
 3. The problem is most likely the path from your local modem phone line to the remote modem.
 - From another phone, dial your remote modem's number and verify that a tone is heard after the first ring.

Select from the following, the one that applies to your modem:

- IBM modem—See the 5841/5842 *Guide to Operations*.
The modem front panel switches can run a data wrap to the remote modem and back to the local modem. Do the Remote Digital Loop Self Test.
- Hayes modem—See the manufacturer's documentation.
The Hayes modem does not have the capability of running a data wrap to the remote modem and back to the local modem. The remote modem can be tested by doing a self test from a terminal attached to the remote modem.

Use your support structure for aid.

040

Use the customer's logon procedure and try to communicate with the host.

Were you able to communicate with the host?

Yes No

041

(Step **041** continues)

041 (continued)

Verify if other users can establish a connection and communicate with this host.

If this is a new installation, enter test mode, and from the 3174 Test Menu, select Test 2 (Display Configuration Panels). Verify the customizing responses related to the modem setup option and switch settings.

The smart-modems have many switch settings and setup options that allow them to control differences in the central switch, terminal operation, and the desired operator interface. The setup option settings can be checked or changed via the use of the AT commands. The local modem settings can be set from a 3174 terminal. The remote modem setup options are set from an attached terminal. If this 3174 is newly installed or you need to check the modem options, see "Modem Specifications and Switch Settings" on page 2-247 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. Reenter test mode, select Test 12 Option 2 (Display Status Summary). (For ASCII terminals, use the Menu Request sequence to return to the AEA Port Tests menu. See step 005.)
2. Check the Status Summary status line for proper results. See Figure 2-48 on page 2-174.
3. Check the ASCII port line for excessive line errors. These errors are counted by the line counter. If the line counter log is greater than 100 errors, status code 817-01 is recorded in the event log. The event log monitors the errors over a longer period of time.
4. Check for any pending status code(s) in the event log. (From the 3174 Test Menu, select Test 1, then Option 2, All Events Logged.) See "Test 1: Display Logs Menu" on page 2-126 and "3174 Event Log" on page 1-20.
5. Determine if this is the customer problem.
6. Verify that the customer did not change customizing parameters, host application, or the host data stream list for special features.

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

The EIA 232D cable to a modem has a male connector at the 3174 and a male connector at the modem or for a terminal emulating a computer. The cable signal leads are the same at each cable end (no crossover of wires). See Figure 2-10 on page 2-106.

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 2-43.

MAP 1050: 3278 (or Equivalent) Terminal Failing to Communicate to ASCII Host

Symptom Explanation	Conditions That Could Cause This Symptom
3278 terminal type customized to communicate to ASCII Host - Any failing combination.	<ul style="list-style-type: none"> • Logic card (location 04) defective. • Open or shorted wires in communication cable. • Loose cable connectors. • Defective terminal. • Incorrect 3174 customizing. • Cable problems due to excessive noise.

CAUTION:

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

001

Before using this MAP, you must verify the following by getting the information from the customer or by running Test 12 and Test 3 (Display Status Summary). See "MAP 1000: ASCII Problem Entry" on page 2-43 and use the procedure in step 3, then return here.

- Verify if only 3278-type terminals are having a problem with the ASCII host.
- Verify if this AEA feature configuration also includes attached ASCII terminals.
- Verify if the ASCII terminal(s) are also having a problem with the ASCII host.

Is the AEA feature configured to include both ASCII and 3278-type terminals?

Yes No

002

- ASCII only—You are in the wrong symptom chart. Go back to the Symptom/Action chart in MAP 1000.
- 3270 only—If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate the 3278-type terminal problem.
- 3270 only—Go back to the Symptom/Action chart in MAP 1000. Select the proper ASCII port attachment symptom and use the MAP to isolate the ASCII host problem.

003

(Step 003 continues)

003 (continued)

Is the problem only with 3278-type terminal(s)?

Yes No

004

- This MAP leg indicates that the ASCII and 3278-type terminals are both having a problem with the ASCII host. Go back to the Symptom/Action chart and select the ASCII symptom to isolate the problem.

005

- If a terminal does not display the S block (Ready Condition), see MAP 0200 to isolate 3278-type terminal problems.
 - If a terminal does not get the ASCII Connection Menu, the problem is most likely due to improper 3174 customizing.
 - Use your support structure for aid.
-

Diagnostic Aids: Offline Tests

Offline tests are started from the 3174 operator panel and are then controlled either from the operator panel or from the terminal connected to port 0. The terminal must be a 3278 or equivalent. The test monitor program (HG 80) is on either the Utility diskette or the fixed disk. If you are using the Utility diskette, install it in drive 1. Offline tests are of three major types:

- Hardware Group Test Alls (81, 82, 87)
- Hardware Group Basic Tests (01 – 52)
- Hardware Group Optional Tests (01, 02, 03, 08, 09, 11 (51 and 52), 21, 26, 31, 80).

Hardware Group Test Alls and Processor/Storage Tests

Hardware Group Test Alls are invoked by entering hardware group numbers 81, 82, or 87 at the Alt 1 IML 40 prompt or the test monitor 4001 prompt message. An optional test parameter can also be entered with the hardware group number that will cause the selected test to loop, stop on error, or both. If an error occurs during these tests, it is saved in a test error log in machine storage unless it is a critical error such as a machine check. If a critical error occurs, the test stops and a status code is displayed. If HG 81, 82, or 87 are looped, errors that occur are written to the Utility diskette at the end of each test run. These errors are displayed by use of the test monitor program (HG 80). If an error occurs that stops 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 runlist. The test runlist varies, depending on which Test All Hardware Group was selected and on which hardware groups are installed in the controller under test.

The chart below is an example of the order tests would run on 3174 Models 51R and 61R with two diskette drives, a type 1 communication adapter, and a terminal adapter.

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)

Test All 81 verifies that the hardware in the controller is working correctly at customer setup (CSU) time. The following tests are performed by Test All 81:

- Processor and storage
- Diskette 1, 2, and fixed disk drive
- All installed adapters
- Port wraps on the terminal adapter
- Communication adapter cable wrap test.

It is recommended that this test be performed only at customer setup time, because of special requirements for successful completion of the test. The special requirements are as follows:

- All external terminal cables must be disconnected from terminal multiplexer adapter (TMA) cards and the terminal adapter in the controller, except for the cable connected to logical port 0. Do not disconnect the coaxial cables that connect the TMAs to the terminal adapter.

- For models with a communication or Concurrent Communication Adapter present, the communication interface cable must be attached to the communication and Concurrent Communication Adapter and the Test/Oper switch on the cable must be set to the Test position.

Note: V.35 interface cables have special requirements for running the CSU tests. For details, “V.35 Cable Wrap Test (Three Test/Oper Switches)” on page 2-100.

- If two diskette drives are present in the controller, valid 3174 diskettes must be in diskette drive 1 and diskette drive 2.
- For models with a Token-Ring adapter present, the Token-Ring adapter cable must be connected to the adapter card.

Test All 82 (Alt 2 IML)

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

- Processor and storage
- Diskette and fixed disk drives
- All installed adapters.

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

Test All 87

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

- Processor
- Storage.

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

Hardware Group Basic Tests

Hardware Group Basic Tests are invoked by 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 only difference is that one specific adapter is being tested. If an error occurs during a hardware group basic test, the test stops and a status code is displayed. Tests can be terminated by use of the *free* function (press Enter). The 4001 message is displayed, and another test request can be entered.

Hardware Group Optional Tests

Hardware Group Optional Tests are invoked by entering a hardware group number (01, 02, 03, 08, 09, 11, 21, 26, 31, 51, 52, or 80) and a function number and/or a function parameter. These tests can be looped by entering an optional test parameter in front of the function number. Hardware Group Optional Tests provide special test capabilities such as communication cable wraps and port wraps. Hardware Group Optional Tests can be selected for the following:

- Diskette drive 01 and 02
- Fixed disk drive
- Operator panel
- Terminal Adapter/3299
- Test monitor (See the note below.)
- Asynchronous Emulation Adapter
- Timer
- Communication adapter
- Token-Ring adapter

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 2-8 lists all the test requests that can be entered. The microcode for these tests is on the Utility diskette or fixed disk. Test requests that start with hardware group numbers 01 – 52 can be entered only at the Alt 1 IML 4001 prompt message. Test requests that start with hardware group numbers 80, 81, 82, and 87 can be entered at either the Alt 1 IML 40 prompt or the test monitor 4001 prompt. Hardware groups 81, 82, and 87 are normally entered at the 40 prompt because these hardware groups load the test monitor program and start a test runlist. The hardware group number is the only required field in a test request entry. The test parameter, function number, and function parameter numbers are optional parameters.

The test request format is:

HG TP FN FP

Where:

- HG = Hardware group number (see Table 2-8)
- TP = Test parameter (optional) (see Table 2-11 on page 2-89)
- FN = Function Number (Optional) (see Table 2-8)
- FP = Function Parameter (Optional) (see Table 2-8)

HG	TP	FN	Description	FP	FP Description	Page
01	90-97		Diskette 1			2-89
01	90-97	01	Diskette 1 Ready Test			2-90
01	90-97	02	Diskette 1 Media Surface Test			2-91
02	90-97		Diskette 2			2-89
02	90-97	01	Diskette 2 Ready Test			2-90
02	90-97	02	Diskette 2 Media Surface Test			2-91
03	90-97		Fixed Disk 1			2-89
03	90-97	31	Fixed Disk 1 Surface Scan			2-93
03	90-97	32	Fixed Disk 1 Defect Fix			2-92
03	90-97	33	Fixed Disk 1 Full Format			2-93
03	90-97	34	Display Fixed Disk 1 Defect Table			2-95
03	90-97	51	CSU Surface Scan			
08	90-97		Timer			2-89
08	90-97	01	Read Timer			2-97
08	90-97	02	Set Timer			2-97
09	90-97		Operator Panel			2-98

Table 2-8 (Page 2 of 2). Function Numbers and Function Parameters						
HG	TP	FN	Description	FP	FP Description	Page
11	90-97		Communication Adapter			2-89
11	90-97	01	Interface Wrap Test			2-100
11	90-97	02	Modem Wrap (external clock)			2-100
11	90-97	04	Modem CD/DSR Status (EIA/V.35)			2-100
11	90-97	05	X.21 Wrap (external clock)			2-100
11	90-97	07	Type 1 Driver Static Test (NTT Japan)			2-100
21	90-97		Asynchronous Emulation Adapter			2-89
21	90-97	01	Driver/Receiver Wrap Test	00-07	Logical Port Number	2-105
26	90-97		Terminal Adapter			2-89
26	90-97	01	Terminal Adapter Port Wrap	00, 08, 16, 24	Terminal Adapter Port Number	2-111
26	90-97	02	Term Mpx/3299-2, 3 Port Wrap	00-31	Logical Port Number	2-111
26	90-97	03	Terminal Path Test	00-31	Logical Port Number	2-111
26	90-97	04	CUT Display Exerciser	00-31	Logical Port Number	2-112
26	90-97	05	Terminal Adapter Wrap All			2-112
26	90-97	06	Terminal Mpx/3299-2, 3 Wrap All	00, 08, 16, 24	Terminal Adapter Port Number	2-112
26	90-97	07	Printer Exerciser Test	00-31	Logical Port Number	2-112
31	90-97		Token-Ring adapter			2-89
31	90-97	01	Cable Wrap Test			2-114
31	90-97	02	Adapter Wrap Test			2-114
31	90-97	10	Display Universal Address			2-114
51	90-97		CCA			2-89
51	90-97	01	Interface Wrap Test			2-100
51	90-97	02	Modem Wrap (external clock)			2-100
51	90-97	04	Modem CD/DSR status (EIA/V.35)			2-100
51	90-97	05	X.21 Wrap Test Type 1 Driver			2-100
51	90-97	07	Static Test (NTT Japan)			2-100
52	90-97		CCA			2-89
52	90-97	01	Interface Wrap Test			2-100
52	90-97	02	Modem Wrap (external clock)			2-100
52	90-97	04	Modem CD/DSR status (EIA/V.35)			2-100
52	90-97	05	X.21 Wrap Test Type 1 Driver			2-100
52	90-97	07	Static Test (NTT Japan)			2-100
80		01	Display Test Log			2-116
80		02	Display Test Log - IML Drive			2-118
80		03	Reset Test Log - IML Drive			2-118
80		04	Display Hardware Configuration			2-118
80		05	Display FRU ID Table			2-119
80		06	Display Test Log Count/Time			2-116
80		07	Display Test Log Count/Time IML Drive			2-119
81	90-97		Test All (CSU Mode)			2-89
82	90-97		Test All (Installed Mode)			2-89

Test Parameters

Test parameters, defined in Table 2-9, are used to qualify a test request.

TP	Description	TP	Description
90	No Options - Default	94	Terminal Control
91	Loop	95	Loop, Terminal Control
92	Stop on Error	96	Stop on Error, Terminal Control
93	Loop, Stop on Error	97	Loop, Stop on Error, Terminal Control

Loop

Loop is used to loop any valid hardware group test request. This parameter is ignored for hardware group 80. This parameter is reset at the end of the test and must be reentered with each test request. To stop a test that is looping, press Enter.

Terminal Control

This parameter requests the test control program to switch control of the tests from the operator panel to the terminal connected to port 0. The terminal must be a 3278 or equivalent. Once control is at the terminal, it remains until another IML is performed. It is not necessary to specify terminal control with each test request. Also, an entry of test parameter 90 will not reset terminal control.

Stop on Error

Stop on error is applicable when HG 81, 82, or 87 has been selected or when looping is specified on an individual hardware group. This parameter is ignored for HG 80. When this parameter is specified, the test control program will stop and display each error as it occurs. A *continue* function can be used to allow the test request to proceed. When running HG 81, 82, or 87 with stop on error off, the test control program will collect each error in a log without stopping and present all the errors at the end of the test.

How to Load the Test Monitor

The Test Monitor is part of the Utility microcode that is contained either on diskette or fixed disk. The following three procedures describe loading the Test Monitor. The first procedure uses the Utility diskette in drive 1, the second procedure uses the Utility diskette in drive 2, and the third procedure uses the Utility microcode on fixed disk. Configuration Support B Utility diskettes are 2.4MB diskettes and require a 2.4MB drive.

Loading the Test Monitor from Diskette Drive 1

1. Insert the Utility diskette into drive 1. If the diskette is labeled 2.4, make sure drive 1 is also labeled 2.4; otherwise, use "Loading the Test Monitor from Diskette Drive 2" on page 2-85.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. 40 is displayed:

For operator panel control

- a. Key in **80**.
- b. Press Enter.
- c. 4001 is displayed.

For terminal control

- a. Key in **8094**.
- b. Press Enter.
- c. Go to the terminal connected to port 0.
- d. 4001 is displayed.

Loading the Test Monitor from Diskette Drive 2

1. Insert the Utility diskette into drive 2. If the diskette is labeled 2.4, make sure drive 2 is also labeled 2.4; otherwise, use "Loading the Test Monitor from Diskette Drive 1" on page 2-84.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. 40 is displayed:

For operator panel control

- a. Key in **0280**.
- b. Press Enter.
- c. 4001 is displayed.

For terminal control

- a. Key in **0280**.
- b. Press Advance.
- c. Key in **94**.
- d. Press Enter.
- e. Go to the terminal connected to port 0.
- f. 4001 is displayed.

Loading the Test Monitor from Fixed Disk

1. Press and hold Alt 1.
2. Press and release IML.
3. Release Alt 1.
4. 40 is displayed:

For operator panel control

- a. Key in **0380** or where:
 03 = Fixed disk drive
 80 = Load test monitor.
- b. Press Enter.
- c. 4001 is displayed.

For terminal control

- a. Key in **0380** where:
 03 = Fixed disk drive
 80 = Load test monitor.
- b. Press Advance.
- c. Key in **94**
- d. Press Enter.
- e. Go to the terminal connected to port 0.
- f. 4001 is displayed.

Terminal Control Test Menus

Terminal control of offline tests is performed on a 3278 or similar terminal connected to port 0 of the controller. Once terminal control is established, a test request can be entered on the Select line of each menu. Depending on the hardware group being tested, two or three menus are displayed. To determine what test input should be entered, see the run procedure for the desired test. There are two methods for entering a test request on the test menus.

Method 1

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. Type in the HG number on the Select line of the Test Menu.
3. Press PF8 or, if no other options, press ENTER.
4. Type in the TP number on the Select line of the Test Parameters Menu.
5. Press PF8 or, if no other options, press ENTER.
6. Type in the FN number and the FP number on the Select line of the Selectable Functions Menu.
7. Press ENTER.

Method 2

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. Type in the entire test request (HG TP FN FP) on the Select line of the Test Menu.
3. Press ENTER.

If Method 1 is used, three menus are displayed. These are the menus that appear if the controller under test has the hardware groups installed as shown on the Test Menu and HG 26 is the hardware group to be tested:

- Test Menu – The hardware groups that are installed are displayed.
- Test Parameters Menu – Optional test parameters are displayed.
- Selectable Functions Menu – Function numbers and function parameters are displayed.

Depending on the hardware group that was selected from the first menu, different function numbers and function parameters are displayed on the Selectable Functions Menu. Some hardware groups do not have the third menu because there are no assigned function numbers or function parameters.

```

_____ Diagnostic Test Menu _____

TYPE HG: Press PF8

HG      Description      HG      Description
01      Diskette 1 - 1.2MB  09      Operators Panel
03      Fixed Disk 1 - 20MB  26      Terminal Adpt
08      Timer              31      Token Ring - 4 MB
                                80      Test Monitor Functions
                                81      Test All - Setup Mode
                                82      Test All - Installed Mode

Select ==> _
4001

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

Figure 2-2. Test Menu (example)

```

_____ Test Parameters _____

TYPE TP: Press PF8

TP Description

90 No Options - Default
91 Loop Request
92 Stop on Error
93 Loop and Stop on Error

Select ==> HG _
4001

PF: 7=Back       8=Fwd
    
```

Figure 2-3. Test Parameters Menu

Selectable Functions	
Terminal Adapter	
FN Description	FP Description
01 Terminal Adapter Port Wrap	PT Terminal Adpt Port 00,08
02 3299-2, 3 Port Wrap	PT Logical Port 00-15
03 Terminal Path Test	PT Logical Port 00-15
04 CUT Display Exerciser	PT Logical Port 00-15
05 Terminal Adapter Wrap All	NR Not Required
06 3299-2, 3 Wrap All	PT Base Port 00,08
07 Printer Exerciser	PT Logical Port 00-15
Function requirements:	
FN 01,02,05,06 - To insure a valid wrap, the cable(s) must be disconnected from wrapped port(s).	
Select ==> HG TP _	
PF: 7=Back	

Figure 2-4. Selectable Functions Menu

How to Run Hardware Group Test Alls or Processor/Storage

Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.

For operator panel control

At 4001:

1. Key in **81, 82, or 87**.
2. Press Enter.

For terminal control

At 4001:

1. Key in **8194 or 8294**.
2. Press Enter.
3. Go to the terminal connected to port 0.
4. The selected test is in progress.

Note: The processor/storage tests (HG 87) cannot be selected under terminal control. Processor/storage can be selected only from the operator panel.

How to Run Hardware Group Basic Tests

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
2. At 4001, key in HG TP,

Where:

HG = Hardware group (see Table 2-10)

TP = Test parameter (optional) (see Table 2-11)

3. Press Enter; the test begins.
4. One of the following status codes is displayed, where

HG = The hardware group being tested:

21HG = Test in progress

22HG = Test in progress

20HG = Test complete

29HG = Test failure

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

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

5. To make another selection at 20XX, press Enter and return to step 2.

These examples assume the Alt 1 IML has been performed.

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.

HG	Unit	HG	Unit
01	Diskette 1/File adapter	11	Communication Adapter
02	Diskette 2	21	Asynchronous Emulation Adapter
03	Fixed Disk	26	Terminal Adapter
08	Timer	31	Token-Ring Adapter
09	Operator Panel	51,52	Concurrent Communication Adapter

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

How to Run Diskette Drive Optional Tests

Two diskette drive optional tests can be performed on the 3174:

- Function number 01 is the diskette drive ready test. This test verifies that the diskette drive ready circuitry and the diskette change function are working correctly.
- Function number 02 is the diskette media surface analysis test. This test is used to check for defective tracks and sectors on a diskette.

It is recommended that these tests be performed at the controller because manual intervention is required to complete these tests successfully.

Diskette Drive Ready Test

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. When 4001 is displayed, key in **HG01**
Where:
HG = 01 (to test diskette drive 1)
HG = 02 (to test diskette drive 2)
01 = Function number 01
3. Press Enter, the test begins.
4. 4561 or 4563 is displayed.
5. Open the diskette drive door; 4560 is displayed.
6. Close the diskette drive door; 4561 is displayed.
7. Open the diskette drive door and remove the diskette; 4562 is displayed.
8. Insert the diskette and close the diskette drive door; 4563 is displayed.
9. Repeat steps 5 through 8 as many times as required to verify that the diskette drive is working correctly.
Note: If the status code does not change after performing an action with the diskette drive, the diskette drive or the file adapter is defective.
10. To select other tests, press Enter; 4001 is displayed.

Diskette Drive Media Surface Test (FN 02)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. At 4001, key in **HG02**
Where:
HG = 01 (to scan a diskette in drive 1)
HG = 02 (to scan a diskette in drive 2)
02 = Function number 02
3. Insert the diskette to be scanned into the selected diskette drive. If the Utility diskette in diskette drive 1 is being scanned, skip this step and go to step 6.
4. Press Enter.
5. At 4565, key in **1**
6. Press Enter.

7. The Status indicators display one of the following codes, where HG is 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).
8. If 4567 is displayed, press Advance and record the additional data. See status code 4567 in the *IBM 3174 Status Codes* manual
9. To continue testing at 4566 or 4567; press Enter and return to step 4.

How to Run Fixed Disk Drive Optional Tests

It is recommended that you run the fixed disk optional tests from a terminal. The panels displayed give the same information as the operator panel, but the information is much easier to read from the display. See "How to Load the Test Monitor" on page 2-84

Warning: Do not power off the 3174 until the selected function comes to a normal completion. Surface defects could occur with lost data if powered off during operation.

Five fixed disk drive optional tests can be performed on the 3174.

Function number 31 is the Fixed Disk Surface Scan test. This function verifies that no damage has occurred to the media (especially after a physical relocation of a 3174).

Function number 32, Fixed Disk Defect Fix, requires a completed surface scan as input. If the surface defect fix is invoked but surface scan has not been executed, the surface scan will be invoked automatically. This function is used to assign alternate sectors/tracks for those found defective by the surface scan test. Recoverable data will be transferred to an alternate sector/track.

Function number 33, Fixed Disk Full Format, erases the disk and maps around any defects on the disk. After the test has been run, 3174 microcode must be copied onto the fixed disk. This is accomplished by using the Copy File function and Media Management Utility described in the *3174 Utilities Guide*.

Function number 34 displays the fixed disk Scan Defect table. Function 34 requires that Function 31 is to be run first.

Function number 51 is called automatically during a "Test All - CSU mode" when a new 3174 is installed. It can also be used in testing a new fixed disk feature. This test checks for several files in the system area that may not be present on a new fixed disk drive. If these files are not found, they are added to the system area. If the files are present, this function just does a surface scan. Customer data that is on the disk will not be affected.

Fixed Disk Drive Surface Scan (FN 31)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. When 4001 is displayed, key in **HG31**
 - Where:
 - HG = 03 (to scan fixed disk drive)
 - 31 = Function number 31
3. Press Enter.

4. One of the following codes is displayed:

Where:

23xx = Test in progress (xx = a number that decrements to 00)

4401 = SCAN complete; No new defects found.

4402 = SCAN complete; DEFECT FIX recommended.

4403 = SCAN complete; DEFECT FIX required.

4404 = SCAN complete; Full FORMAT required.

5. If the test does not come to a normal completion, press Advance and record the additional data. See the status codes in *IBM 3174 Status Codes* manual.

6. To continue testing at 4xxx, press Enter, 4001 is displayed.

Fixed Disk Drive Defect Fix (FN 32)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.

2. When 4001 is displayed, key in **HG32**

Where:

HG = 03 (to fix defects on fixed disk drive)

32 = Function number 32

3. Press Enter.
4. One of the following codes is displayed:
Where:
 - 23xx = Test in progress (xx = bad cylinder)
 - 4408 = DEFECT FIX complete; No new defects found.
 - 4409 = DEFECT FIX complete; All defects resolved.
 - 4410 = DEFECT FIX complete; IML Select Utility required. See "How to Perform Media Management" in the *3174 Utilities Guide*.
 - 4411 = DEFECT FIX complete; Data restoration required. See "How to Perform Media Management" and "How to Copy Files" in the *3174 Utilities Guide*.
 - 4412 = DEFECT FIX complete; Full FORMAT required.
5. If the test does not come to normal completion, press Advance and record the additional data. See the status code in the *IBM 3174 Status Codes* manual.
6. To continue testing at 4xxx, press Enter; 4001 is displayed.

Fixed Disk Drive Full Format (FN 33)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. When 4001 is displayed, key in **HG33**
Where:
 - HG = 03 (to fix defects on fixed disk drive)
 - 33 = Function number 33.
3. Press Enter.
4. 4415 Warning message is displayed ("Full Format will erase data").
 - To abort the test, press Enter; 4001 is displayed.
 - To Format, key in **2** and press Enter.
5. One of the following codes is displayed:
Where:
 - 23xx = Test in progress (xx = a number that decrements to 0).
 - 4416 = FULL FORMAT complete. Data restoration required. See "How to Perform Media Management" and "How to Copy Files" in the *3174 Utilities Guide*.
 - 4417 = FULL FORMAT terminated; Drive replacement required.
6. If the test does not come to normal completion, press Advance and record the additional data. See the status code in the *IBM 3174 Status Codes* manual.
7. To continue testing, press Enter; 4001 is displayed.

Display Fixed Disk Scan Defect Table (FN 34)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. When 4001 is displayed, key in **HG34**
Where:
 - HG = 03 (to fix defects on fixed disk drive)
 - 34 = Function number 34
3. Press Enter.
4. One of the following codes is displayed:
Where:
 - 4420 = Defect table complete.
 - 4421 = Defect Table missing. (Function 31 must be run prior to selecting Function 34.) Run Surface Scan (FN 31)
5. If the test does not come to normal completion, press Advance and record the additional data. See the status codes in the *IBM 3174 Status Codes* manual.,
6. 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. See *IBM 3174 Status Codes* manual for an explanation of the status code.

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 Manufacture's Defect Table

0007 = count of hard defects

0000 = count of defects from format Utility termination

0001 = count of defects successfully recovered

0003 = count of defects successfully relocated

The following panel is an example of how the same information (with detail information) would be displayed.

Fixed Disk n Scan Defect Table										
Total entries: tttt										
Cyl	Hd	Sct	New	Used	Sys	OMD	Hrd	RNs	Rec	Rel
totals			0005	0002	0002	0001	0007	0000	0001	0003
0001	01	08	1	1	1	0	1	0	0	1
0003	00	06	1	0	1	0	1	0	0	1
0005	03	01	1	1	0	0	1	0	0	0
002B	03	0F	0	0	0	0	1	0	0	0
0072	00	10	1	0	0	0	0	0	1	0
010C	02	08	1	0	0	0	1	0	0	1
014F	00	11	1	0	0	0	1	0	0	1
0263	01	04	1	0	0	0	1	0	0	1

PF: 3=Quit 7=Back 8=Fwd

Where:

- n = number of the fixed disk drive
- tttt = count of all defects found
- Cyl = Cylinder
- Hd = Head
- Sct = Sector
- New = count of new defects not previously resolved
- Used = count of defects containing data
- Sys = count of defects in the System area
- OMD = count of defects in the Manufacturers Defect Table
- Hrd = count of hard defects
- RNS = count of defects from format utility termination
- Rec = count of defects successfully recovered
- Rel = count of defects successfully relocated

Figure 2-5. Display Scan Defect Table in Terminal Mode (Example).

CSU Surface Scan (FN 51)

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. When 4001 is displayed, key in **HG51**

Where:

- HG = 03 (to scan fixed disk)
- 51 = Function number 51

3. Press ENTER.
4. One of the following codes is displayed:

- 23xx = Surface Scan Test in progress (xx = a number that decrements to 0).
- 4401 = SCAN complete; No new defects found.
- 4402 = SCAN complete; DEFECT FIX recommended.
- 4403 = SCAN complete; DEFECT FIX required.
- 4404 = SCAN complete; Full FORMAT required.

5. If the test does not come to a normal completion, press Advance and record the additional data. See the status codes in the *IBM 3174 Status Codes* manual.
6. To continue testing at 4xxx; press ENTER, 4001 is displayed.

How to Read and Set the Timer

These tests provide the capability of setting and reading the timer counter and setting the day counter. The timer runs from 00:00 hours and minutes to 23:59 hours and minutes. The day counter runs from 0000 days to 0255 days. When the timer counter goes from 23:59 to 00:00, the day counter is increased by 1. When the day counter reaches 0255, it returns to 0000 when the timer passes 23:59. When setting the timer, valid values are 0000 to 2359; when setting the day counter, valid values are 0000 to 0255.

Note: The timer and day counters are reset to zeros when the controller is powered off and on. This procedure has to be performed each time a POR occurs. If it is not performed, the timer defaults to starting time 00:00, and day 0000.

How to Read the Timer (FN 01)

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
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. It is not necessary to press Advance. Go to step 10.

5. Press Advance.
6. The time of day is displayed as HRMN.
7. Press Enter.
8. To make another selection, press Enter; 4001 is displayed.
9. If any other status code is displayed, see the *IBM 3174 Status Codes* manual.

How to Set the Timer (FN 02)

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
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 time of day can be entered at the same time. Enter all eight digits without spaces and press Enter. Go to step 10.
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.
8. To make another selection, press Enter; 4001 is displayed.
9. If any other status code is displayed, see the *IBM 3174 Status Codes* manual.

How to Run the Operator Panel Test

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

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. At 4001, key in **09**
3. 4505 is displayed in the Status indicators. Using Table 2-12, press the listed keys on the operator panel keypad and verify that the correct characters display in the four Status indicators.

Key Pressed	Result
0-9	0-9
Clear	E
Alt 1	H
Alt 1 (again)	- (dash)
Alt 2	L
Alt 2 (again)	Blank
Advance	P

4. Observe the red and green indicators on the operator panel and press any numeric key 0–9.
 - a. Red indicator goes off.
 - b. Green indicator comes on for about 1.5 seconds.
 - c. About 10 seconds later, the red indicator comes on.
5. Press Enter.
6. If 2009 is displayed, press Enter for the 4001 prompt message.

How to Run Communication and Concurrent Communication Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
2. Before selecting a function number, determine if the controller has a type 1 or type 2 communication adapter.

Type 1 = FRU type number 9253
 Type 2 = FRU type number 927X.
 Type 1 = FRU type number 9263.
 Type 2 = FRU type number 9267.

Note: Table 2-13 and the paragraphs following "Communication Adapter Function Number Descriptions" describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.

3. At 4001, key in HG FN
 Where:

HG = 11, 51, or 52
 FN = Function number (select from Table 2-13)

4. Press Enter; the test begins.
5. The Status indicators display one of the following codes, where 11 is the hardware group being tested:

21HG = Test in progress
 22HG = Test in progress
 20HG = Test completed
 3030 = Test failed

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

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

FN	Description	Condition
01	Interface Wrap Test	<ul style="list-style-type: none"> For EIA/V.35: Set the cable Test/Oper switch to Test or use wrap plug (P/N 6423419). For X.21: Set the cable Test/Oper switch to Test or use wrap plug (P/N 6423420).
02	Modem Wrap	Set the interface cable Test/Oper switch to Oper.
04	Type 1 Interface Status Test	Set the cable Test/Oper switch to Oper.
05	Type 2 Interface Clock Test	Set the cable Test/Oper switch to Test.
07	Type 1 Driver Static Test	None.

In the tests that follow, see Table 2-14 and Figure 2-6 on page 2-101 for switch settings and Figures 2-7 through 2-9 for communication line flow.

Communication Adapter Function Number Descriptions

The following paragraphs describe the function numbers for type 1 (EIA/V35) and type 2 (X.21) communication adapters.

Interface Wrap Test (FN 01): This test provides a data wrap of the driver receiver portion of the type 1 and type 2 communication adapter. With the external interface cable connected to the 3174 and disconnected from the modem, the data is wrapped through the Test/Oper switch(es) on the interface cable. A wrap plug for each adapter is available as a branch office tool that can be used in place of the interface cable. To ensure a valid wrap test, the following condition must be met:

For Type 1 Communication Adapter (EIA/V.35): Disconnect the external interface cable from the modem. Connect the external interface cable to the 3174 and set the Test/Oper switch to Test, or install wrap plug (P/N 6423419) on the communication adapter port.

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

Notes:

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

Modem Wrap (FN 02): This test provides a data wrap through the external modem. This test is valid for both type 1 and type 2 communication adapters. To ensure a valid wrap test, the following conditions must be met:

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

Type 1 Interface Status Test (FN 04): This test checks 'data set ready' and 'receive line signal detect' (also called 'carrier detect'). A status code is written to the Status indicators in 2-second intervals to indicate the status of these two interface leads. Status code 4513 means both lines are on. Status codes 4510 – 4512 indicate other conditions for these lines. If other status codes are displayed, see the *IBM 3174 Status Codes* manual. This test is only for the type 1 communication adapter (EIA/V.35). To ensure a valid test, the external interface cable must be connected to the communication adapter and to the modem. The Test/Oper switch on the cable is set to Oper. Once this test is running, it does not stop until the Enter key is pressed.

Type 2 Interface Clock Test (FN 05): This test provides a data wrap through the attached modem using the modem clock. This test is only for the type 2 communication adapter (X.21). To ensure a valid test, the external interface cable must be connected to the communication adapter and to the modem. The Test/Oper switch on the cable is set to Oper.

Type 1 Driver Static Test (FN 07) (NTT Japan): This test sets the following interface leads to their logical on condition for measurement purposes: 'data terminal ready' (DTR), 'request to send' (RTS), 'data set ready' (DSR), 'test', and 'select standby' (Sel Stby). This test is valid only for the type 1 communication adapter. Status code 4514 indicates the interface leads are at their logical on condition. Once this test is running, it does not stop until the Enter key is pressed.

V.35 Cable Wrap Test (Three Test/Oper Switches)

This procedure is used with the V.35 interface cable that has three Test/Oper switches on the end. The V.35 interface cable should be disconnected from the modem when running wrap tests. This cable provides better detection of adapter/cable problems when either the A or B signal (receive, transmit, or clock) is failing. The wrap provided with communication adapter FN 01 is used in conjunction with the Test/Oper switch. See Table 2-14 on page 2-101 and Figure 2-6 on page 2-101 for the switch settings of the Test/Oper switches before starting the wrap test. If any other switch setting is used, the wrap test fails.

Description	Switch 1	Switch 2	Switch 3
Test Mode 1 (Wrap A Lines)	Test	Oper	Test
Test Mode 2 (Wrap B Lines)	Test	Test	Oper
Test Mode 3 (Wrap A and B Lines)	Test	Test	Test
Operate	Oper	Oper	Oper

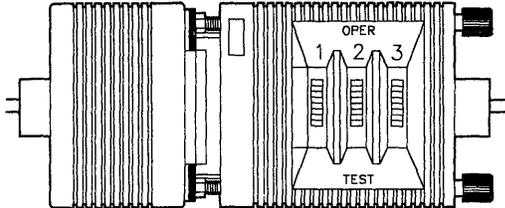


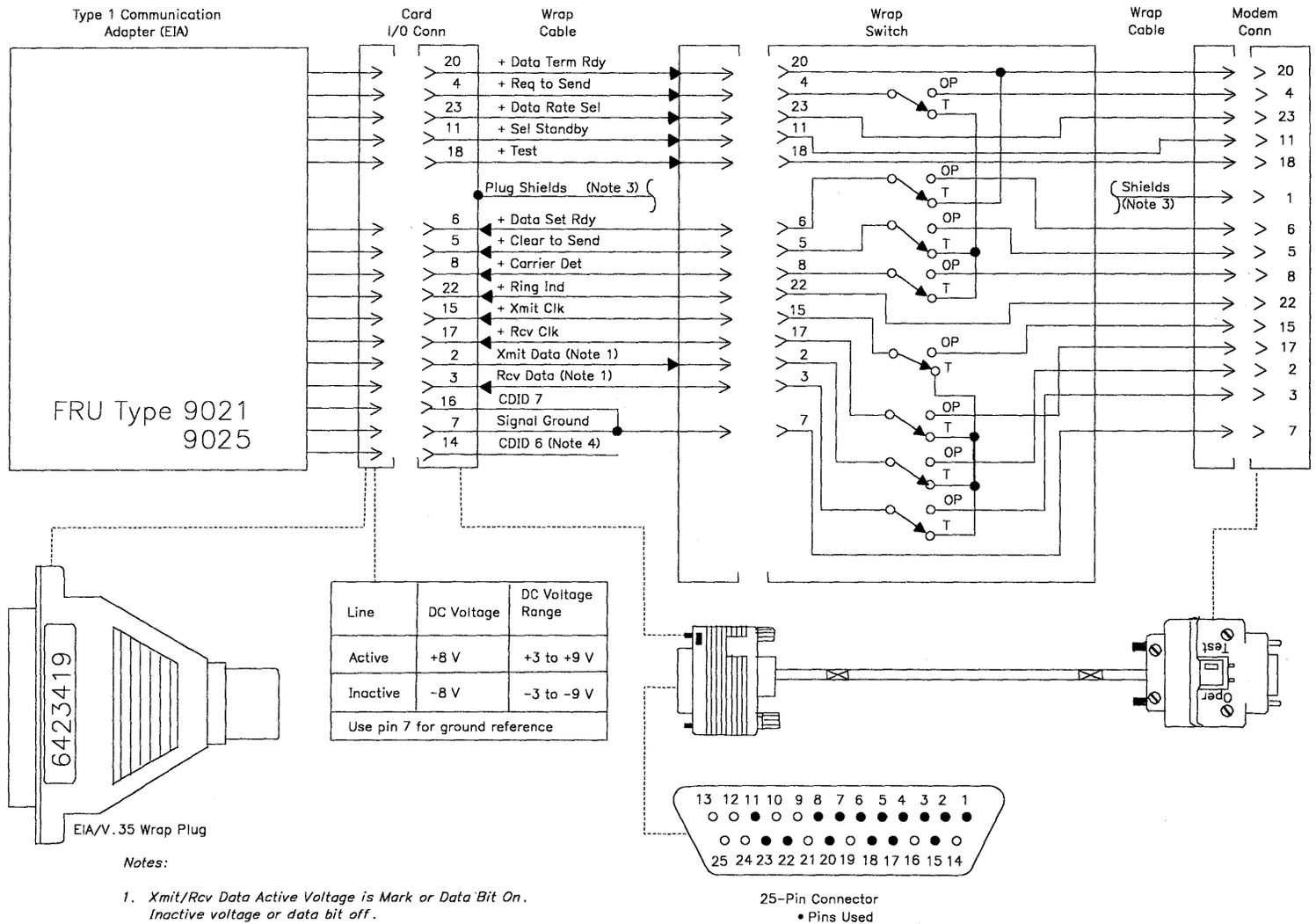
Figure 2-6. V.35 Three-Switch Test/Oper Switch

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

On early-production 3174 Establishment Controllers, the V.35 communication interface cable has a one-switch Test/Oper switch. A special wrap plug (P/N 61X4603) is shipped with the controller. The wrap plug is tied to the end of the cable near the Test/Oper switch. This wrap plug is used in conjunction with communication adapter FN 01 to test the early-production V.35 interface cables.

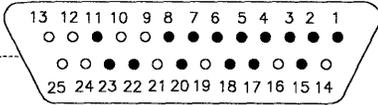
1. Disconnect the interface cable from the short modem adapter cable.
2. Set the Test/Oper Switch to **Oper. Oper.**
3. Install the wrap plug (P/N 61X4603) at the end of the cable that has the Test/Oper switch.
4. Perform the communication adapter wrap test FN 01.

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



6423419

EIA/V.35 Wrap Plug



25-Pin Connector
• Pins Used

Figure 2-8. X.21 Communication Line Flow, Switched and Nonswitched (Cable and Wrap Plug)

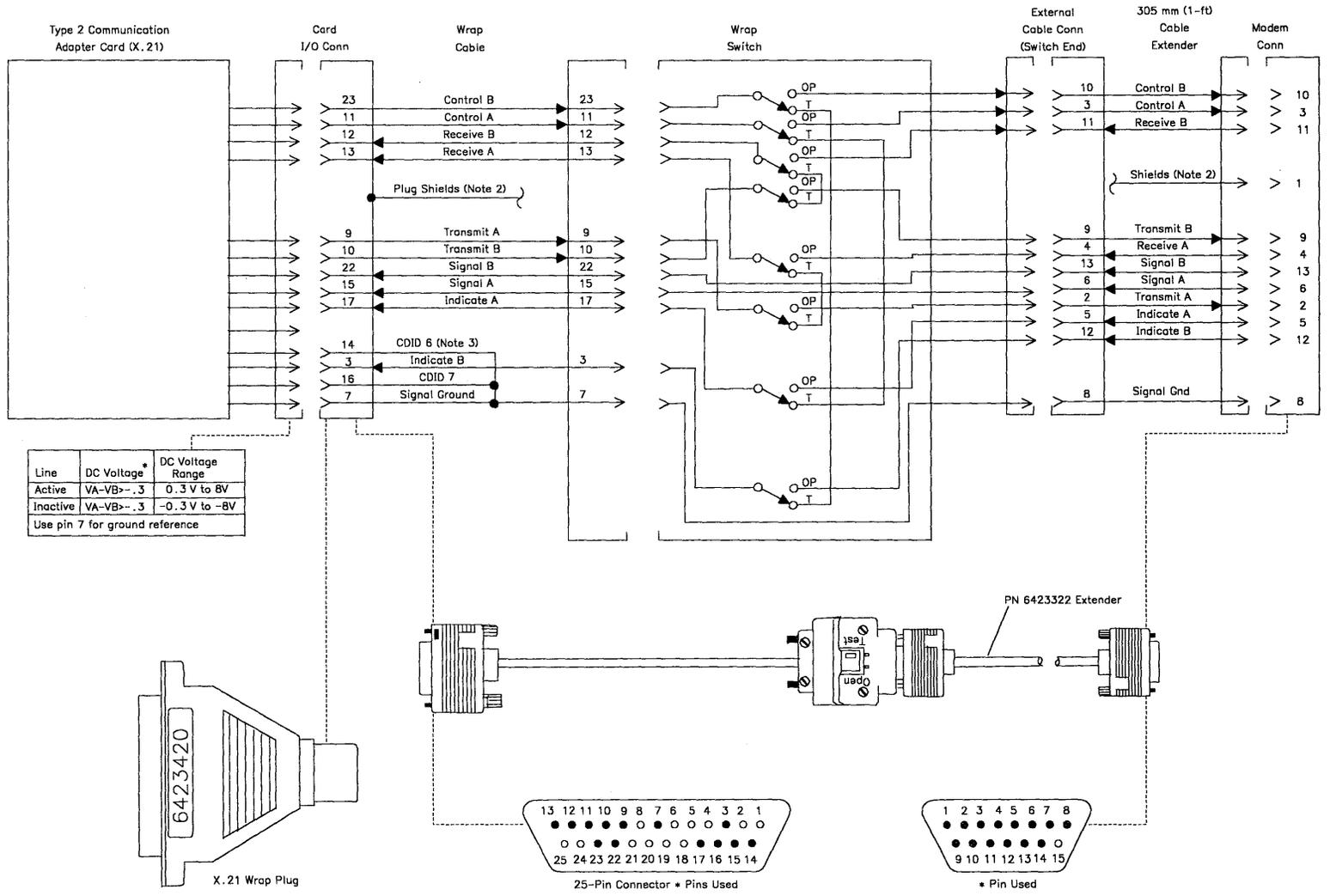
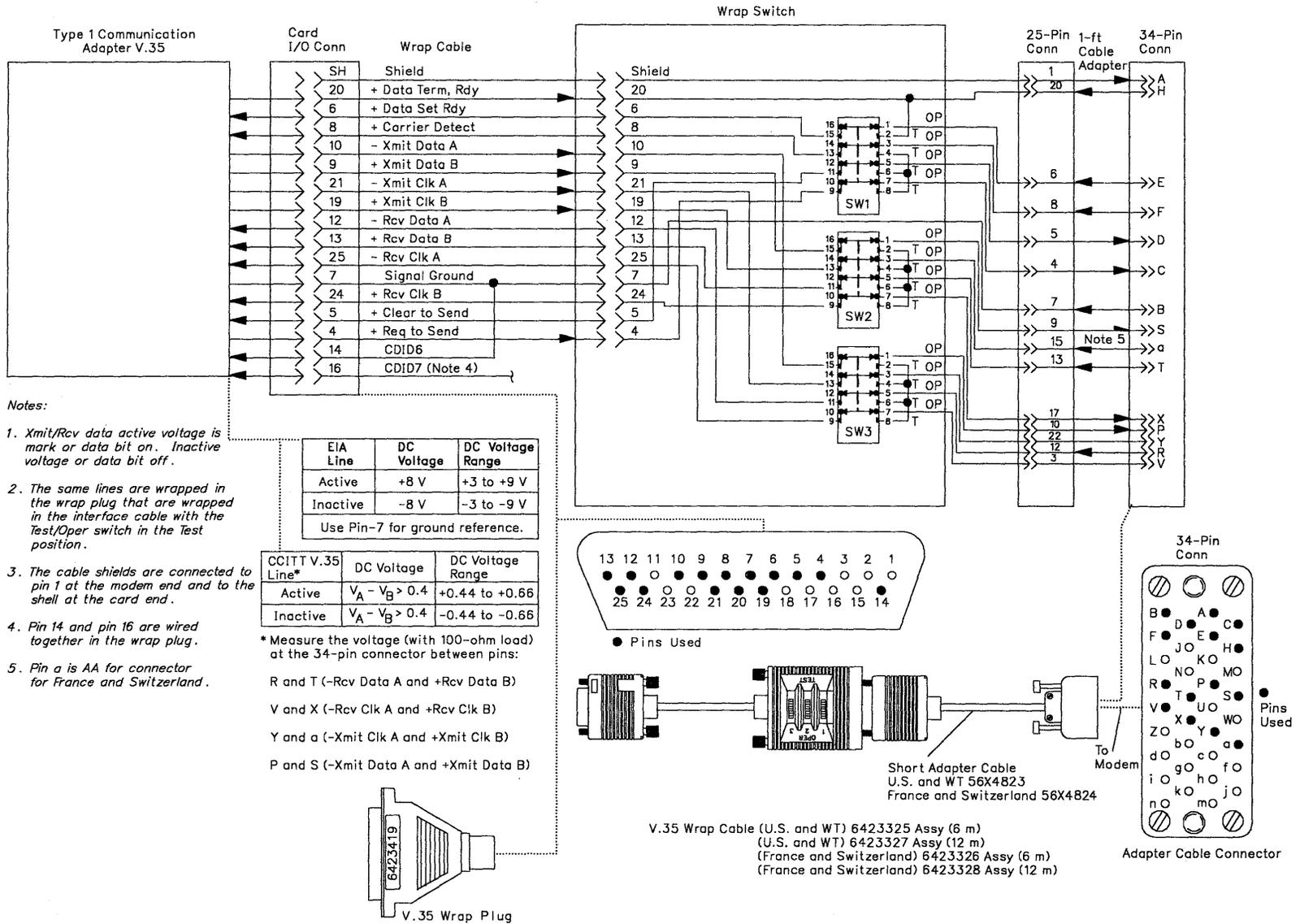


Figure 2-9. V.35 Communication Line Flow (Cable and Wrap Plug)



How to Run Asynchronous Emulation Adapter Optional Tests

1. Load the test monitor. See "How to Load the Test Monitor" on page 2-84. Use the terminal control procedure.
2. Go to the terminal connected to port 0.
3. Select a function number (FN) and function parameter (FP).

Note: Table 2-15 and the paragraph following Table 2-15 describe the purpose of the function number/function parameter and any prerequisite conditions that have to be met before a particular function number/function parameter can be used.

4. At 4001, key in HG FN FP
Where:
HG = 21
FN = Function number
FP = Function parameter
5. For operator panel control, when keying in more than four digits, press Advance after each group of four until the last digit keyed is displayed.
6. Press Enter; the test begins.
7. The Status indicators display one of the following codes, where 21 equals the hardware group being tested:

2021 = Test completed without error
2121 = Test in progress
2221 = Test in progress
3060 = Test failed
3061 = Test failed
For all other status codes, see the *IBM 3174 Status Codes* manual.
8. To terminate the test or to make another selection, press Enter.

Note: When these tests are being looped in terminal control mode, it may be necessary to press the Enter key on the controller operator panel to stop the test.

FN	Description	FP	Description	Condition
01	Asynchronous Emulation Adapter Port Driver/Receiver Wrap	00-07	Logical Port 00-07	Disconnect the Asynchronous Emulation Adapter external interface cable.

Asynchronous Emulation Adapter Function Number Description

See the following paragraph for a description of the port wrap function number.

Asynchronous Emulation Adapter Port Driver/Receiver Wrap (FN 01) This function number provides an internal wrap test of individual ports of the Asynchronous Emulation Adapter card. The function parameter is used to specify the port number to be wrapped. The AEA Wrap Plug (P/N 61X4602) must be connected to the port being wrapped.

Asynchronous Emulation Adapter External Cables and Wrap Plug Wiring

The following pages explain and illustrate the various types of cabling used for attachment to the Asynchronous Emulation Adapter. The illustrations show the pin-to-pin assignments of the cables and wrap plug, and the use of the "null modem." Some of these cables cannot be wrapped using the offline tests and must be checked for continuity.

Switched and Nonswitched Modem Cable

The modem cable for switched and nonswitched (leased) lines has a 25-pin D-shell connector on each end. Nine of the pins are used and wired one-for-one for data terminal equipment (DTE) to data communications equipment (DCE) attachment. (See Figure 2-10.) This cable must meet the EIA 232D interface requirements as specified in the *3174 Site Planning Guide*, GA23-0213.

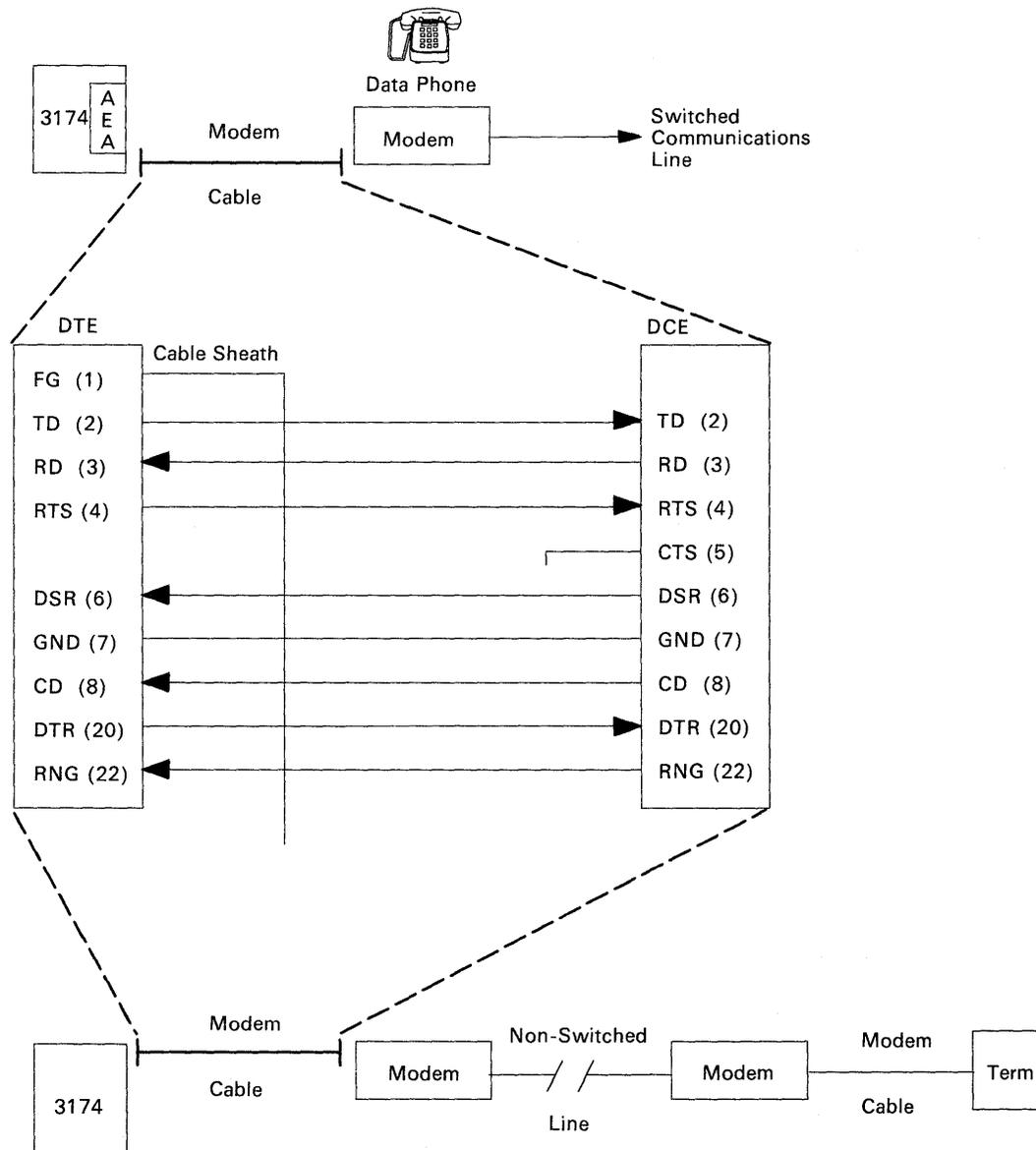


Figure 2-10. Switched and Nonswitched Line Modem Cable

Direct Cable

The direct cable is used to attach an ASCII terminal or host directly to the 3174 controller. It has a 25-pin D-shell connector at each end and must be between 1 meter (3 feet) and 15 meters (50 feet) in length. The controller or device end connector must be wired according to Figure 2-11. This cable must meet specifications for direct connect cabling found in the *3174 Site Planning Guide*, GA23-0213.

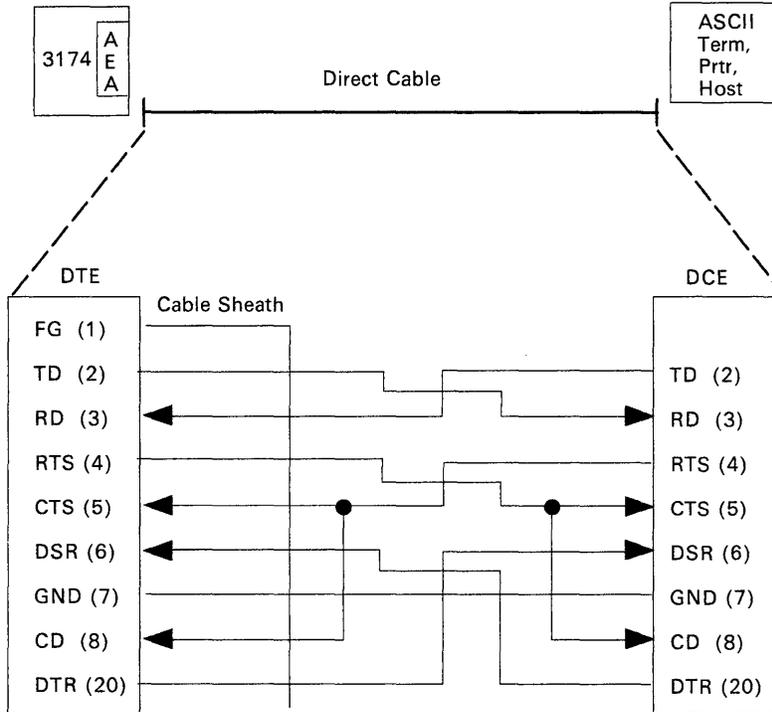


Figure 2-11. Direct Cable

Direct Cabling Using a Null Modem

This cabling arrangement is an alternate method of direct connect between a 3174 controller and an ASCII device (terminal or host). The null modem is simply a "black box" with two male 25-pin D-shell connectors. The wiring allows attachment to an ASCII terminal or host using a standard one-to-one cable. See Figure 2-12.

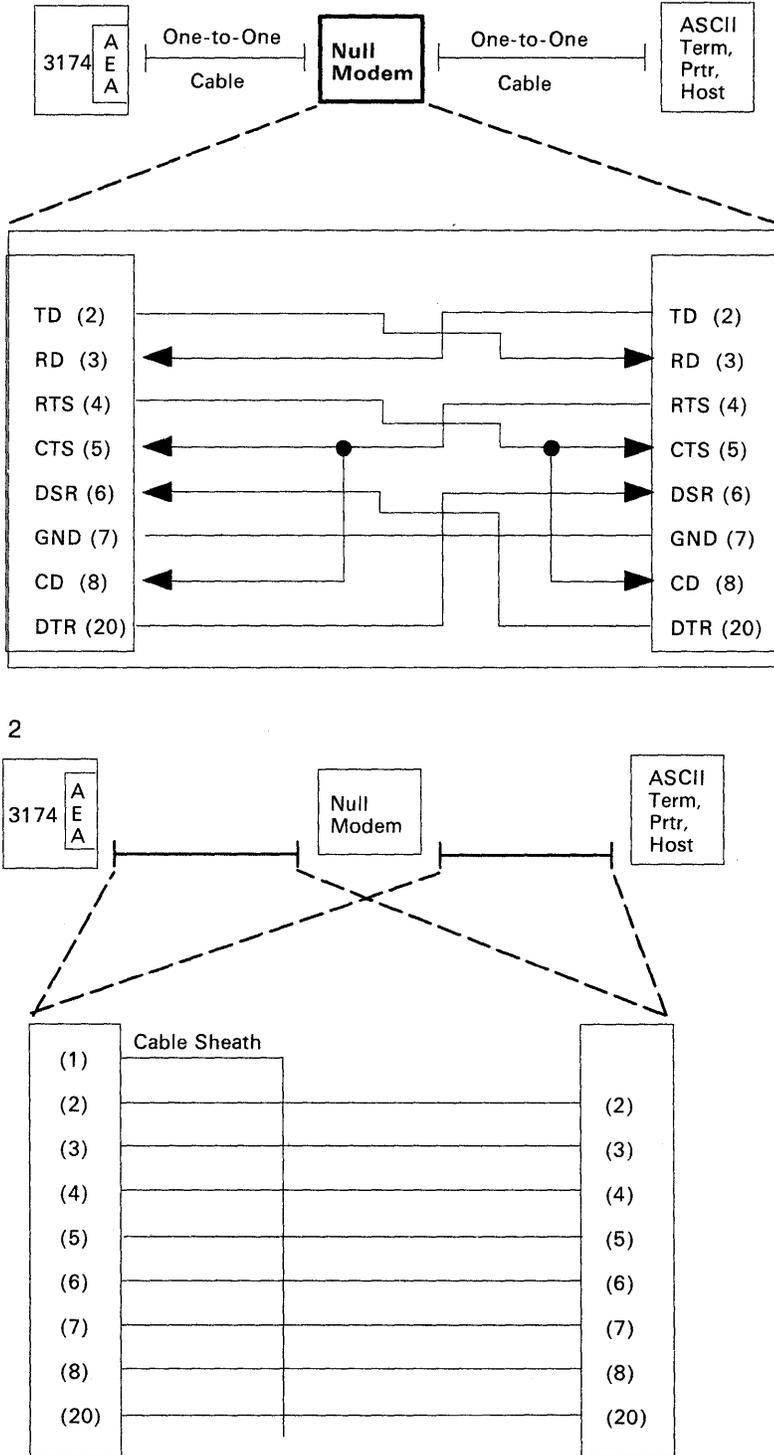
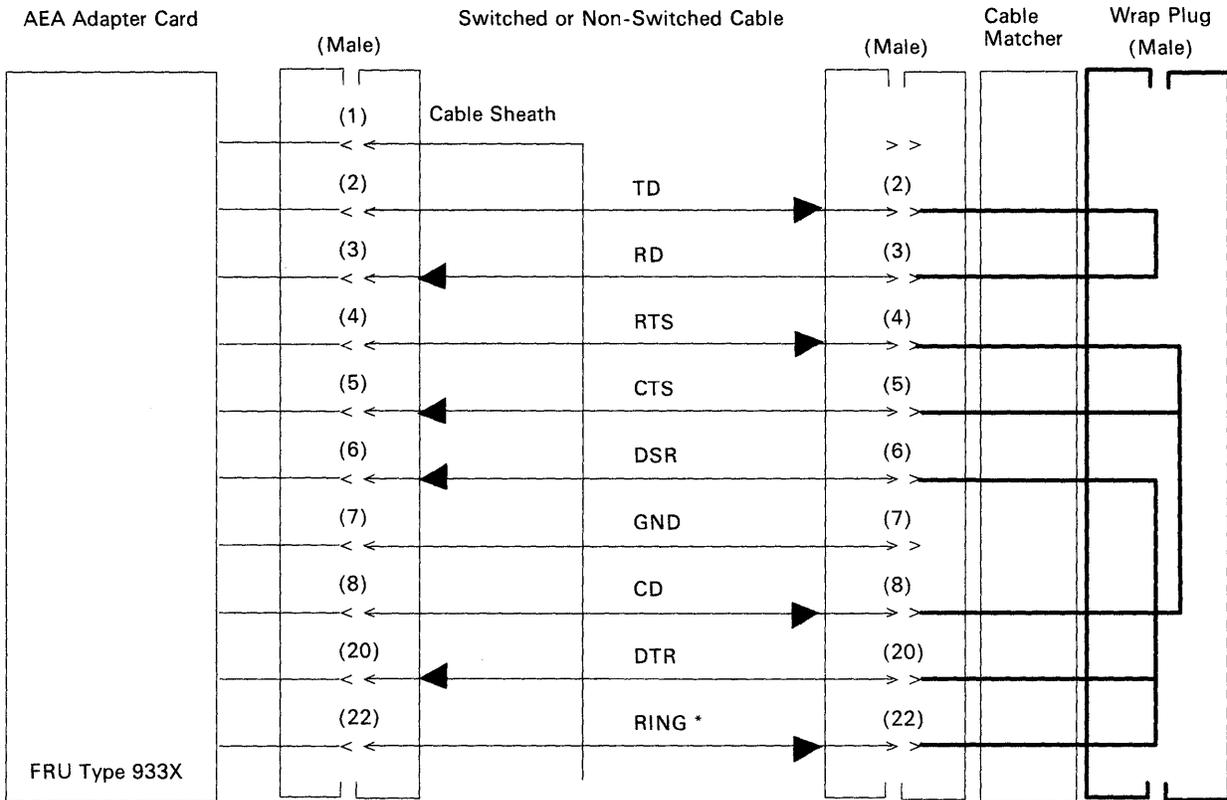


Figure 2-12. Direct Cabling Using a Null Modem

Asynchronous Emulation Adapter Wrap Plug Wiring

The illustration below shows the wiring of the Asynchronous Emulation Adapter wrap plug in conjunction with the switched and nonswitched communication cable. The wrap plug must be connected to a cable matcher before installation to the cable is possible. (The cable and the wrap plug both have male connectors.)

The direct cable, shown in Figure 2-11 on page 2-107, cannot be wrapped using the Asynchronous Emulation Adapter wrap plug. The EIA Interface Monitor Test Set (breakout box), P/N 453637, is required to wrap that cable and also possibly a cable matcher.



* Switched Only

Figure 2-13. Switched and Nonswitched Cable with Wrap Plug

How to Run Terminal Adapter/Multiplexer Optional Tests

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
2. Select a function number (FN) and function parameter (FP).

Note: Table 2-16 on page 2-111 and the paragraphs following Table 2-16 describe the purpose of each function number/function parameter and any prerequisite conditions that have to be met before a particular function number/function parameter can be used.

3. At 4001, key in HG FN FP,
Where:
HG = 26
FN = Function number
FP = Function parameter

4. For operator panel control, when keying in more than four digits, press Advance after each group of four until the last digit keyed in is displayed.

5. Press Enter; the test begins.

6. The Status indicators display one of the following codes, where 26 is the hardware group being tested:

2126 = Test in progress

2226 = Test in progress

2026 = Test completed

3040 = Test failed

3041 = Test failed

3042 = Test failed

4550 = Test completed

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

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

Note: When these tests are being looped in terminal control mode, it may be necessary to press the Enter key on the controller operator panel to stop the test.

FN	Description	FP	Description	Condition
01	Terminal Adapter Port Wrap	00–08	Terminal Adapter Port 00–08	Disconnect the port signal cable.
02	Multiplexer Port Wrap	00–15	Logical Port 00–15	Disconnect the multiplexer port signal cable.
03	Terminal Path Test	00–15	Logical Port 00–15	Terminal attached and powered on.
04	CUT Display Exerciser	00–15	Logical Port 00–15	Terminal attached and powered on.
05	Terminal Adapter Wrap All			Disconnect port 00–08 signal cables.
06	Multiplexer Wrap All	00, 08	Terminal Adapter Port Number	Disconnect the output signal cables from the multiplexer.
07	Printer Exerciser Test	00–15	Logical Port 00–15	Printer attached, powered on and ready.

Terminal Adapter Function Number Descriptions

The following paragraphs describe the port wrap function numbers. Figure 2-14 on page 2-112 shows the terminal attachment.

Terminal Adapter Port Wrap (FN 01): This function number provides an internal wrap test on the individual ports on the terminal adapter. The function parameter is used to specify the port number to be wrapped. Status code 2026 indicates successful test completion. Status code 3040 indicates the test failed.

Multiplexer Port Wrap (FN 02): This function number provides an internal wrap of the individual output ports on a 3299 Terminal Multiplexer Model 2 or 3 or a 7232 Dual Control Unit Terminal Multiplexer. The function parameter is used to specify the logical port number to be wrapped. This number is obtained by adding the port number of the terminal adapter that the multiplexer is connected to and the port number of the multiplexer.

Example

To wrap port 2 on the 3299 that is connected to port 8 on the terminal adapter, enter **10** as the function parameter.

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

Note: Wrap Test (FN 02 and 06) cannot be performed on a 3299 Terminal Multiplexer Model 1.

Terminal Path Test (FN 03): This function number provides a path test on terminals that are directly attached to the terminal adapter or attached through a multiplexer. The function parameter is used to specify the logical port number of the terminal to be tested. The path is automatically determined by the diagnostic. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. Status code 4050 indicates successful test completion. Status code 3041 indicates the test failed.

Terminal Exerciser Test (FN 04): This function number provides a data test to terminals that are directly attached or attached through a multiplexer. The physical path to the terminal is automatically determined by the test. The function parameter is used to specify the logical port number of the terminal to be tested. A data pattern appears on the 3278 or similar terminal when this test is performed. See the example in the description of FN 02 to determine which port number should be entered as the function parameter. Status code 4550 indicates successful test completion. Status codes 3041 and 3042 indicate the test failed.

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

Multiplexer Wrap All (FN 06): This function number provides an internal wrap of the eight output ports on a 3299 Model 2 or 3 or a 7232 Dual Control Unit Terminal Multiplexer. The function parameter is used to specify the port number on the terminal adapter that the multiplexer is attached to.

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

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

Note: Function numbers 05 and 06 run on the terminal adapter logic when the customer setup (HG81) test is performed.

Printer Exerciser Test (FN 07): This function number provides a data test to printers that are directly attached or attached through a 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 3262, 3268, 3287, 3289, 4214, 4224, 4234, 4245, 5210, or equivalent printers. Status code 4550 indicates successful test completion. Status code 3041 and 3042 indicate the test failed.

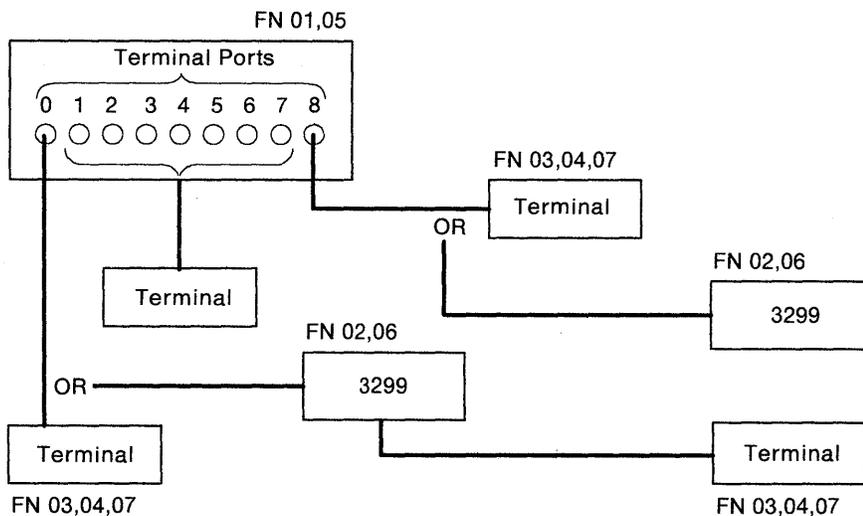


Figure 2-14. Block Diagram of Terminal Attachment

How to Run Token-Ring Adapter Optional Tests

Warning: Do not run the adapter wrap (FN 02) with the Token-Ring adapter cable attached to the controller and the ring. If the cable is attached to the ring, Token-Ring problems occur.

1. Disconnect the Token-Ring adapter cable from the Token-Ring.
2. Load the test monitor. See "How to Load the Test Monitor" on page 2-84.
3. Select a function number.

Note: Table 2-17 and the paragraphs following "Token-Ring Adapter Function Numbers" on page 2-114 describe the purpose of each function number and any prerequisite conditions that have to be met before a particular function number can be used.

4. At 4001, key in HG FN

Where:

HG = 31

FN = Function number

5. Press Enter; the test begins.
6. The status indicators display one of the following codes, where 31 equals the hardware group being tested:

2131 = Test in progress

2231 = Test in progress

2031 = Test completed

2931 = Test failed

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

7. To make another selection at 2031 or 2931, press Enter.

FN	Description	Condition
01	Cable wrap test	The Token-Ring adapter cable connected or wrap plug (P/N 6165899) installed. Note: The Token-Ring adapter cable must be connected to the controller. The other end of the cable can either be connected or disconnected from the Token-Ring Network.
02	Adapter Wrap Test	Wrap Plug (P/N 6165899) installed. Token-Ring adapter cable disconnected from the ring.
10	Display universal Address	Note: The universal address is displayed in the following format: 4535 XXXX XXXX XXXX. The 12 Xs are the universal address.

Token-Ring Adapter Function Numbers

The following paragraphs describe the function numbers for the Token-Ring adapter.

Cable Wrap (FN 01): This test wraps frames through the self-shorting Token-Ring adapter cable or through the wrap plug. The test simulates the operations that take place when the adapter is connected to the ring. Before selecting this test, either connect the Token-Ring adapter cable to the adapter, or install a wrap plug (P/N 6165899).

Notes:

1. If the Token-Ring adapter cable is attached to the IBM Cabling System, the frames will wrap to the 8228 Multistation Access Unit and back to the controller. This can be used as a problem isolation technique. If the wrap test passes with the cable disconnected from the Cabling System but fails with the cable connected to the Cabling System, the problem is not in the controller or the Token-Ring adapter cable.
2. This test runs automatically when CSU tests are performed.

Adapter Wrap (FN 02): This test wraps frames at the I/O connector of the Token-Ring adapter. Before running this test, install a wrap plug (P/N 6165899). Although this test is similar to function number 01, it checks different circuitry on the Token-Ring adapter.

Display Universal Address (FN 10): This function number is used to display the universally administered address contained on the Token-Ring adapter. This address is 12 digits long and is assigned to each Token-Ring adapter card manufactured by IBM. For the proper display of this address, this function number should only be requested when the tests are being controlled from the terminal connected to port 0. When this function number is selected, the following status code is displayed:

4535 XXXX XXXX XXXX

XXXX XXXX XXXX = The universally administered address

Token-Ring Adapter Replacement Considerations

After a Token-Ring adapter has been replaced, if the controller fails to communicate with the Token-Ring Network, addressing problems may be the cause of the failure. Each Token-Ring adapter is shipped with a unique universally administered address encoded on it. Customers can elect to use the universally administered address or their 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 a customer use locally administered addresses. Use the following procedure to determine which kind of addresses the customer is using:

1. Perform a normal IML. See "Normal Initial Microcode Load (IML)" on page 1-42.
2. Go to any terminal connected to the controller.
3. Press and hold ALT, press TEST.
4. Key in /2,2

For 3174 Models 51R, 52R, 61R, and 62R examine configuration question 900.

For 3174 Models 53R and 63R examine configuration question 106.

Note: These questions contain the Token-Ring adapter address.

5. If the first 2 bits of byte 0 contain 01, the customer is using locally administered addresses.

Note: If the customer is using locally administered addresses, then addressing is not the cause of the failure unless some other device on the ring already is using the same address.

6. If the first 2 bits in byte 0 contain 00, the customer is using universally administered addresses. In this case the following action must be taken by the customer:

For 3174 Models 51R, 52R, 61R, and 62R, they must reconfigure the controller and enter the new universal address of the replacement Token-Ring adapter card (question 940).

For 3174 Models 53R and 63R, they must reconfigure the controller and enter the new universal address of the replacement Token-Ring adapter card for question 106. They must also reconfigure the controller that serves as the gateway controller for the Token-Ring. Currently these controllers are 3174 Models 1L, 1R, 2R, 51R, and 52R with the gateway feature and 372X communication controllers.

7. To provide the customer with the universal address of the replacement Token-Ring adapter card see "How to Run Token-Ring Adapter Optional Tests" on page 2-113.

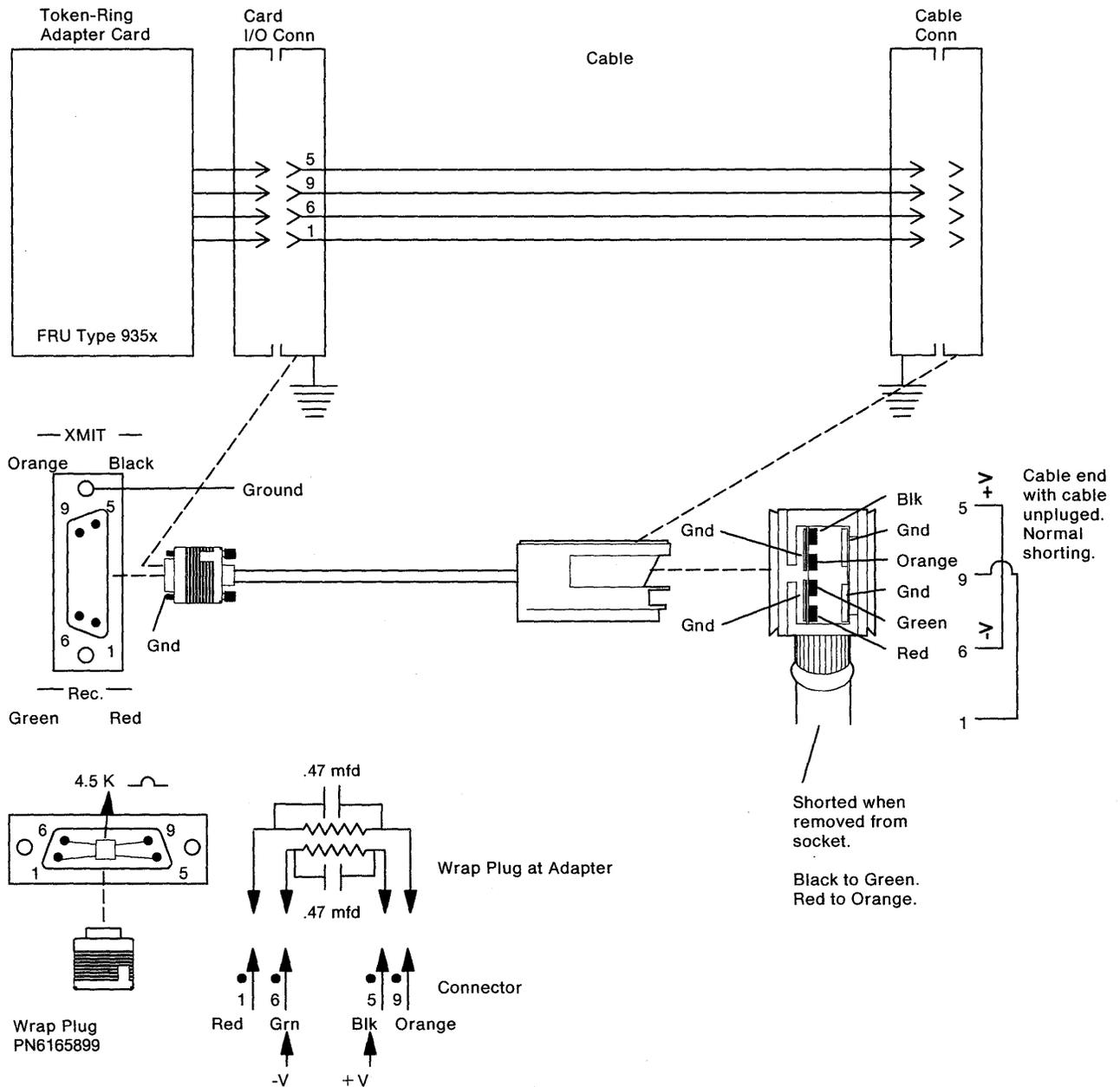


Figure 2-15. Token-Ring Communication Line Flow (Cable and Wrap Plug)

How to Display the Test Log

This test is used to display the test log that is created when errors occur during hardware group tests. The test log can only be displayed from the 4001 prompt. If prompt 4001 is not displayed, or a test failure status code such as 29HG or 3030 is displayed, press Enter to obtain the 4001 prompt.

Note: Do not make any other test request or IML the controller as the Test Log will be reset.

1. Select a function number.

Note: Table 2-18 and the paragraphs following "Test Log Function Number Descriptions" describe the purpose of each function number.

2. Key in **80FN** where:
80 = Load Test Monitor
FN = Function Number

Note: If test control is at the operator panel, key in **8094**, press Advance, key in **FN**, and press Enter to switch test control and to execute the test log function.

3. Press Enter.
4. To make another selection at 2080, press Enter.

FN	Description
01	Display Test Log
06	Display Test Log Count/Time

Test Log Function Number Descriptions

The following paragraphs describe the function numbers that are used to display the test log and the test log count/time.

Display Test Log (FN 01): When function number 01 is selected in terminal control mode, the test log (shown in Figure 2-16 on page 2-117) 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.

Note: If the test log does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the test log.

Display Test Log Count/Time (FN 06): Function number 06 is used to display the test log pass count (PCNT) and elapsed time (HHMMSS) when running tests from the operator panel (FN 01 only displays the status codes in operator panel control).

Status code 4580 PCNT PCNT 00HH MMSS is displayed if no errors are recorded in the test log.

Status code 4581 PCNT PCNT 00HH MMSS is displayed if errors are recorded in the test log.

_____ Test Log _____		PANEL 1 OF 1	
TOTAL PASS COUNT 5		START TIME 15:26:57	ELAPSED TIME 01:40:03
PASS	ELAPSED TIME	STATUS CODES	
1	00:00:02	3024 0102 9112 02	9025 03
2	00:02:35	3024 0102 9112 02	9025 03
3	00:05:03	3024 0102 9112 02	9025 03
4	01:20:06	2987 9051 05	
5	01:22:36	2987 9051 05	
PF: 3=Quit 8=Fwd			

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

Figure 2-16. Test Log

How to Display the Test Monitor Functions (Terminal Control)

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
2. Go to the terminal connected to port 0. The test menu is displayed and 4001 is displayed under the select line.
3. Select a Function number.

Note: Table 2-19 and the paragraphs following "Test Monitor Function Number Descriptions" describe the purpose of each 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.

FN	Description
02	Display Test Log – IML Drive
03	Reset Test Log – IML Drive ¹
04	Display Hardware Configuration
05	Unformatted FRU ID Table
07	Display Test Log Count/Time IML Drive

¹Function number 03 erases the error log contained on the diskette.

Test Monitor Function Number Descriptions

The following paragraphs describe the purpose of the test monitor function numbers.

Display Test Log – IML Drive (FN 02)

Function number 02 displays the Test Log (shown in Figure 2-16 on page 2-117) from the IML drive. This function number is valid only when looping a Test All diagnostics, such as HG 81, 82, or 87, and is only used when the test log is not available. See "How to Display the Test Log" on page 2-116.

Note: If the test log on the IML drive diskette does not contain any errors, status code 4580 PCNT PCNT 00HH MMSS is displayed instead of the Test Log.

Reset Test Log – IML Drive (FN 03): Function number 03 resets the Test Log information contained on the IML drive. The Test Log information that is contained in machine storage is reset each time a test is selected.

Display Hardware Configuration (FN 04): Function number 04 displays the Hardware Configuration Table, shown in Figure 2-17 on page 2-119, and must be selected when the diagnostics are controlled from the terminal. This table shows all the hardware installed in the controller that generated a valid FRU ID number during an IML. The SC column in the table will contain a 32XX number only if a problem has occurred with a FRU during the IML. See the *IBM 3174 Status Codes* manual to determine what a particular status code means.

Display FRU ID Table (FN 05): Function number 05 displays an unformatted version of the FRU ID table. This function number must be selected when the diagnostics are controlled from the terminal.

Display Test Log Count/Time IML Drive (FN 07): Function number 07 is used to display the IML drive test pass counts (PCNT) and elapsed times (HHMMSS). Status code 4580 PCNT PCNT 00HH MMSS is displayed if no errors are recorded in the log. Status code 4581 PCNT PCNT 00HH MMSS is displayed if errors are recorded in the log.

Hardware Configuration Table									
HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
00	9001	00	Invalid Card/Cond		09	9522	07	Ops Panel Assembly	
01	9111	01	Diskette 1 - 1.2MB	32XX	11	9025	03	Type 1 Com Adpt-XXX	
01	9025	03	File Adpt		21	933X	04	Asynch Emul Adpt	
03	9130	02	Fixed Disk - 20MB	32XX	87	9025	03	Storage 1MB	
08	9025	03	Timer		26	9025	03	Terminal Adpt	
09	9025	03	Ops Panel Adpt						

Select Test; press ENTER =====>_

PF: 3=Quit 12=Test Menu

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

Note: This table shows the configuration for a Model 51R.
 The FRU type numbers may vary for different models of the 3174.
 Only those FRUs that are physically installed are displayed in this table.
 All the adapters that are listed with the same FRU type 9025 are contained on the planar board.

For the communication adapter, the XXX equals one of the following:
 WRP = EIA/V.35 wrap plug is connected.
 V.35 = V.35 cable is connected.
 EIA = EIA cable is connected.
 NC = Nothing is connected.
 WRP = X.21 wrap plug is connected.
 INV = An undefined cable or wrap plug is connected.

Figure 2-17. Hardware Configuration Table (Example)

Diagnostic Aids: Online Tests

Online Tests Configuration A5/S5

Introduction

The online tests are in two sections. One set of Online Tests is for microcode that is Configuration Support A and S. The other set is for microcode that is Configuration Support B (see page 2-181). If you are not sure of your 3174 microcode release level, select online test 5, option 1 (/5,1). The release level will be displayed on the screen.

Online tests are selectable from any 3278, 3279, or similar display attached to the controller. These tests are *not* selectable from distributed function terminals, such as a 3290. This test facility can be used during normal subsystem operation and is available after entering test mode. Test mode is entered by pressing the ALT and TEST keys simultaneously on an attached display /station keyboard. The following tests can be selected by entering one of the test formats shown below or from the 3174 Test Menu shown in Figure 2-18 on page 2-123.

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 2-125.

/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 2-126. The following types of error logs can be displayed:

/1,1 – Response time monitor log: RTM statistics
/1,2 – All event log: Error statistics for the 3174
/1,3,n – Hardware group: Error statistics for a specific hardware group
/1,4,n – Port: Error statistics for a specific terminal port
/1,4,n,m – Port, hardware group: Error statistics for a specific terminal port of a specific hardware group
/1,5,xxxx – Status code: Error statistics for a specific status code
/1,6,n – Logical terminal: Error statistics for a specific logical terminal
/1,7 – Change log mode (Normal/Intensive).
/1,8 – Event log summary.

Test 2 (Display Configuration Panels): Provides both hardware and microcode configurations on the controller.

For detailed information about Test 2, see page 2-132.

/2,1 – Hardware configuration: The hardware configuration is displayed.
/2,2 – Configuration questions: The panels presented during configure (except panel 118) are displayed.
/2,3,n – Device Definition: If the 3174 is configured for both PAM and LTA, the PAM panel will be displayed first and then the LTA panel.
/2,4 – Asynchronous Emulation Adapter configuration: The Asynchronous Emulation Adapter configuration is displayed.

Test 3 (3270 Device Status Information): The status of all terminal adapter (HG 26) attached devices is displayed. For detailed information about Test 3, see page 2-134.

- /3,1 – Status Summary is displayed.
- /3,2,n – Error counters for port n (n=0-31) are displayed.
- /3,3,n – Connectivity for port n (n=0-31) is displayed

Test 4 (Reset Logs and Cable Errors): Resets the event log, traces, cable errors, and the response time monitor log. For detailed information about Test 4, see page 2-139.

- /4,1 – Resets the response time monitor log.
- /4,2 – Resets the event log, traces, and cable errors
- /4,3 – Resets the cable errors.

Test 5 (Display Vital Data): Provides the following 3174 information:

Model Number	Controller ID (serial number)
Microcode functional release level	Microcode maintenance release
Installed microcode patches	Installed RPQs
DSL information.	

For detailed information about Test 5, see page 2-140.

- /5,1 Display Controller Vital Data
- /5,2,n,m Display Port Vital Data

Test 6 (Display Control Blocks): The port control areas and host control data are displayed. Can also display all logical terminal extensions (if any). For detailed information about Test 6, see page 2-143.

- /6,1,n – Register page
- /6,2 – The port control area information for the requestor's port is displayed.
- /6,2,n,m – The port control area information for a specific port and hardware group is displayed.
- /6,3 – X.25/X.21 SHM Host Control Data

Test 7 (Color Convergence): For more information, see page 2-155.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-155.

Test 9 (Token-Ring Tests): Provides the ability to display the status of the Token-Ring network, the Token-Ring adapter status counters, and attached links. Test 9 also provides the ability to reset the Token-Ring network and attached link status counters. For detailed information about Test 9, see page 2-156.

- /9,1 – Monitor Token-Ring status.
- /9,2 – Display Token-Ring adapter status summary.
- /9,3 – Reset Token-Ring adapter status counters.
- /9,4 – Display link status summary for all links.
- /9,5,n – Display link status summary for link address n.
- /9,6 – Reset link status counters for all links.
- /9,7,n – Reset link status counters for link address n.
- /9,8 – Display gateway host status summary.

Test 10 (Port Wrap Tests): Provides a port wrap test for terminal adapter ports (00, 08, 16, 24), TMA ports 00 – 31, and 3299 Model 2 and 3 ports 00 – 31. For detailed information about Test 10, see 2-166.

- /10,1,n – Direct wrap for a specific terminal adapter port
- /10,2,n – 3299/TMA port wrap

Test 11 (Trace Control): Provides an internal trace capability. This function is available only to service personnel. For detailed information on Test 11 see "Test 11: Trace Control" on page 2-167.

Test 12 (Asynchronous Emulation Adapter Tests): Provides access to a test for an Asynchronous emulation Adapter Terminal, port, or smart-modem. It also provides a status summary and capability to reset error counters on any or all Asynchronous Emulation Adapters. For detailed information on Test 12, see page 2-170.

- /12,1 – AEA Port Tests Menu
- /12,2 – Display status summary
- /12,3 – Reset line errors on all AEA HGs
- /12,3,n – Reset line errors on HG n.
- /12,4,m,n – Display error counters for port m on HG n (m=0-7, n=21-23)
- /12,5,m,n – Display connectivity for port m on HG n (m=0-7, n=21-23)

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controller. For detailed information about Test A, see page 2-178.

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 2-180.

- /D,n – DFT dump for port n.

3174 Test Menu

To display the 3174 Test Menu, shown in Figure 2-18, perform the following steps at any 3278 or similar display.

1. Press and hold ALT. Press TEST.
2. Press PF12, or CLEAR, or PA2.

_____ 3174 Test Menu _____	
Test	Description
0	Terminal check
1	Display event logs and response time log
2	Display configuration panels
3	3270 device status information
4	Reset logs and cable errors
5	Display vital data
6	Display Control Areas
7	Color convergence
8	Extended functions and program symbols
9	Token-ring tests
10	Port wrap tests
11	Trace control
12	Asynchronous emulation adapter tests
A	Alerts
D,n	Dump device on port n (n=0-31)

Select test; press ENTER ==>_

PF: 3=Quit

Figure 2-18. 3174 Test Menu

Online Test Format

The general format for all online tests is /t,s,n,m, where:

t = test number

s = option number for tests that have menus, such as test 1

n,m = value(s) required by some test menus.

For example:

A test entry of /1,2 will display all log records.

A test entry of /1,3,2 will display the log records for HG02.

These tests can also be selected by entering the following:

Example 1

1. From any select line, enter /1
The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter 2
All log records are displayed.

Example 2

1. From any select line, enter /1
The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter 3,2
The log records for HG02 are displayed.

Test 0: Terminal Check

Provides a facility to test the requesting terminal's basic functions (such as highlighting, nondisplay, and insertion), as well as feature functions (such as light pens, magnetic card readers, and scanners).

To request Test 0, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in the following:
 - a. /0 or /
 - b. Press ENTER.

The test pattern shown in Figure 2-19 is displayed.

```

                ____Terminal Check____

3174 Controller
Hardware Group      nn
Port Number        mm

                ?SEL PEN           SEL PEN
                  &SEL PEN         >SEL PEN
NON DISPLAY        INSERT CK

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

PF:   3=Quit                12=Test menu

```

WHERE:

- nn = The adapter HG number of the terminal that requested the test.
 mm = The port number of the terminal that requested the test.
 NON = The nondisplay field that should not appear on the screen.

Figure 2-19. Test 0 Display Pattern

The following terminal functions are tested:

- High-intensity function
- Nondisplay function
- Selector pen (if one is attached)
- Various key functions and modes
- Four-color function and base-color switch capability on a 3279 or similar color display station
- Audible alarm (if one is attached).

Test 1: Display Logs Menu

Test 1 provides a response time log and event statistics for terminals, hardware groups, and ports. To select a specific event log from the Logs Menu, shown in Figure 2-20, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /1
3. Press ENTER; the Logs Menu is displayed.
4. To display a specific event log, type in the option number of the desired log and press ENTER.

```

                _____ Logs Menu _____

Option      Description          (Current log mode: Normal )

 1          Response time log
 2          All events logged
 3,n        Hardware group (n=0-99)
 4,n        Port n (n=0-31)
 4,n,m      Port n, hardware group m (n=0-31,m=0-99)
 5,xxxx     Status code (replace x's with search digits)
 6,n        Logical terminal (n=0-254)
 7          Change log mode (normal/intensive)
 8          Event log summary (by category and hardware group)

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

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

For Models 1L through 13R, valid terminal adapter port numbers are 0 to 31.
 For Models 51R through 63R, valid terminal adapter port numbers are 0 to 15.
 For Models 81R through 92R, valid terminal adapter port numbers are 0 to 7.

Figure 2-20. Test 1 Menu

Option 1. Type 1 to select option 1 from the Logs Menu. The resulting panel shows the response time monitor (RTM) log if the controller is configured for RTM.

Option 2 – 6. Similar panels are displayed when options 2, 3, 4, 5, or 6 are selected from the Logs Menu. The difference in the format of the log record panels is the title line. Each panel contains the menu selection and the specified parameter value. If no event record exists for the requested event log, a No entries were found message is displayed. To select a log record from the Logs Menu, enter one of the following test requests:

- 2 All the errors in the event log are displayed.
- 3,n (n = a specific hardware group number from 0 to 99) All errors in the event log for the hardware group selected are displayed.
- 4,n (n = a specific terminal port number from 0 to 31) all errors in the event log for the port number selected are displayed.
- 4,n,m (n = a specific terminal port number from 0 to 31; m = a specific hardware group number from 0 to 99) all errors in the event log for the port number on the specific hardware group selected are displayed.

5,xxxx (the x's are replaced with a status code). Four characters must be entered. An x can be used as a "don't care" character. For example: On the select line on the Logs Menu panel, enter **5,x501**. The event log will be searched, and all the 501 status codes that occurred since the last time the logs were reset will be displayed.

6,n (n = a specific logical terminal number from 0 to 254) all errors in the event log for the logical terminal number that was selected are displayed.

Option 7. Type **7** to change the log mode from **Normal** to **Intensive** and from Intensive back to Normal. The current log mode is noted on the Test 1 Menu screen. Normal is the mode regularly used for logging errors. Intensive was created to record those high-frequency loggable errors that are not recorded in Normal mode. Because of the high frequency of the errors, Intensive mode should only be used when needed. To guard against continued use, the controller will change the log mode back to Normal when a 76-hour timer expires.

Option 8. Type an **8** the Event Log Summary is displayed. It provides a single panel of error log summary information available through the /1 test in 3174 online TEST MODE. All current log records, both internal and on diskette or fixed disk, are divided into the following event categories. A breakdown by Hardware Group (HG) is under each category. See Figure 2-21.

_____ 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	HG	HG	HG	HG	HG			
	26 1	00 1	16 2	02 2	26 4	02 2				
	00 1			99 3		26 10				
				01 1						
To go directly to other tests, enter: /Test,Option										
Select test: press ENTER ==>_										
PF: 3=Quit 12=Test menu										

Figure 2-21. Event Log Summary (Example)

Log Records Example:

Figure 2-22 illustrates the panel displayed if you select option 4 with a specific port number and hardware group.

```

_____ Log Records - All _____

(Day/Time since last POR: 000/08:11)
Day Time  SC  QA  PHG_PN  CHG_PN  LT  Extended data bytes (B1-B16)
          B1  B3  B5  B7  B9  B11  B13  B15
000 08:11 0315 58 16
          9210 1100 01
000 00:05 0384 05 99
          0387 0385
000 00:03 0500 01 16
000 00:02 0503 01 16
000 00:02 3174 01 00
015 21:48 0402 02 16      26_02 002 0000 0003 F350 0000
015 21:22 0401 03 16      26_02 006 0001 0004 3c40 4000
015 21:20 0209 51 26_08 16      008
015 21:19 0201 51 26_08 16      008
015 21:07 3174 01 00
015 20:01 0311 01 87          9052 1900

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

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

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

Figure 2-22. Log Record Display Panel

Day/Time

The Day/Time value indicates the setting of the 3174 interval timer when the request to display the log is entered. Since the interval timer is reset to zeros when the controller is powered off and on, it also indicates the elapsed time since the power-on occurred. This timer can be set to the actual time of day using an offline test. The day value range is 000 to 255 and is increased by 1 every 24 hours. The time field is specified as 00 hours through 23 and 00 minutes through 59.

The Day/Time represents the day and time with respect to power-on when the log event occurred.

SC Field

SC = The base status code that was logged. See the *IBM 3174 Status Codes, GA27-3832*, for the recovery action.

QA Field

QA = The qualifier associated with the base status code.

PHG and CHG Fields

PHG (Primary Hardware Group) and CHG (Connection Hardware Group) = The hardware group associated with the error that occurred. The PHG field contains 00 or 99 if the error is not associated with a particular hardware group, or if the hardware group cannot be identified. The values 00 and 99 are not displayed in the CHG field. An example of this would be a 3278 terminal attached to a TMA in a 3174 Model 1L or 11L.

The PHG would be HG26 and the CHG would be HG16. The hardware groups for all models of the 3174 are shown in Table 2-20.

Table 2-20. Hardware Group Numbers			
HG	Unit	HG	Unit
00	Invalid or unknown	22	Asynchronous Emulation Adapter
01	Diskette Drive 1/File Adapter	23	Asynchronous Emulation Adapter
02	Diskette Drive 2/File Adapter	26	Terminal Adapters
03	Fixed Disk 1/File Adapter	26	Terminal Multiplexer Adapters
04	Fixed Disk 2/File Adapter	31	Token-Ring Adapter
08	Timer	46	Encrypt/Decrypt Adapter
09	Operator Panel	80	Test Monitor
11	Communication Adapter	81	Test All CSU Mode
16	Channel Adapter	82	Test All Installed Mode
16	Channel Driver/Receiver	87	Processor/Storage
21	Asynchronous Emulation Adapter	99	Unassigned Hardware Group

PN Field

PN = The port number (PN) is used in conjunction with the PHG and CHG fields in the Log Records menu. This field is not displayed at the operator panel.

The Hardware Group 26 port numbers for the 3174 Models 1L through 13R range from 0 to 31. The Hardware Group 26 port numbers for 3174 Models 51R through 63R range from 0 to 15. The Hardware Group 26 port numbers for 3174 Models 81R through 92R range from 0 to 7.

LT Field

LT = The logical terminal number, if the error is related to attached terminals. The LT field is not displayed at the operator panel. Certain terminals may use multiple logical terminals, such as a 3290.

Extended Data Fields (B1—B16)

The extended data fields contain supplementary information that may be useful to resolve a problem, such as TYPE and LOCA of the failing FRU, or the failing bytes in a data stream error. To determine the definition of the extended data (B1 – B16), see the *IBM 3174 Status Codes*, GA27-3832. The extended data field in the *IBM 3174 Status Codes* correlates to this field. See the following example on how to correlate a log entry to the *IBM 3174 Status Codes*: Log Entry = 0504 0511 00 9253 22

- 0504 = Status code
- 0511 = Qualifier and hardware group
- 00 = PN (none associated with this log entry)
- 9253 = FRU Type number
- 22 = Location of the FRU

To find this status code in the *IBM 3174 Status Codes*, look for status code 0504 with a QA field of 05.

Status Code Entry = 0504 05HG B1B2 B3B4

- 0504 = Status code
- 05HG = Qualifier and hardware group
- B1B2 = FRU Type Number
- B3B4 = Location of the FRU

Test 1, Option 1

If the 3174 has been configured for local display of the RTM log or the host has enabled this function, the /1,1 Test allows an operator to display the RTM log on authorized displays (except terminals such as the 3290). An example of the Response Time Monitor log is shown in Figure 2-23 on page 2-130.

@ = nnn										
/1,1										
@	DEF	CTR#1	BDY#1	CTR#2	BDY#2	CTR#3	BDY#3	CTR#4	BDY#4	OV
00	1	10	0.5	11,415	1.0	316	5.0	21	1:00.0	6
01p	1	0	0.5	0	1.0	0	5.0	0	1:00.0	0
02?	1	651	0.5	0	1.0	0	5.0	0	1:00.0	14,458
03	*2	251	0.5	512	1.0	56	5.0	0	1:00.0	1
04i	1 *	31	1.0	11	2.0	4,371	5.0	4	.1.0	2
05_	1	0	0.5	0	1.0	0	5.0	0	1:00.0	0
06	*3	1	1.0	61	2.0	4	3.0	0	4.0	45
07p	1	1,415	0.5	890	1.0	323	5.0	0	1:00.0	1,381

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

Figure 2-23. RTM Log

The example shows representative information for the first eight logical terminals. If the 3174 is not customized for RTM, the display station keyboard is inhibited. Each time the PF8 key is pressed, the next group of eight terminals is displayed.

- @ = Device or logical unit (LU)
- p = Printer (no RTM statistics)
- i = Distributed function terminal
- _ = Never powered up (no RTM statistics)
- * = Parameter set by host
- ? = RTM disabled by host for this device
- DEF = Response Time Definition
 - 1 = the time to the first character written on the terminal.
 - 2 = the time to keyboard is usable by the operator.
 - 3 = the time to CD/EB.
- CTR#1 = First-counter response time = 0 up to BDY 1 value
- CTR#2 = Second-counter response time greater than BDY 1 up to BDY 2 value
- CTR#3 = Third-counter response time greater than BDY 2 up to BDY 3 value
- CTR#4 = Fourth-counter response time greater than BDY 3 up to BDY 4 value
- BDY 1 = First boundary in minutes and seconds
- BDY 2 = Second boundary in minutes and seconds
- BDY 3 = Third boundary in minutes and seconds
- BDY 4 = Fourth boundary in minutes and seconds
- OV = Overflow (response time exceeding last boundary).

Note: The displayed boundaries are rounded to the nearest tenth of a second.

Reset the Response Time Monitor

The operator at an authorized display can reset the RTM logs of all configured devices. All log information is reset except the customized boundaries, the customized RTM definitions, and pending transaction status. See "Test 4: Reset Logs and Cable Errors" on page 2-139. When the reset is completed, a completion message appears on line 23.

If the 3174 is not customized for RTM, when /4,1 is entered, a message appears stating the function is not supported for this configuration.

Test 2, Option 1

The following panel is displayed.

Hardware Configuration Table									
HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
00	9001	00	Invalid Card/Cond		09	9522	07	Ops Panel Assembly	
01	9111	01	Diskette 1 - 1.2MB	32XX	11	9025	03	Type 1 Com Adpt-XXX	
01	9025	03	File Adpt		21	933X	04	Asynch Emul Adpt	
03	9130	02	Fixed Disk - 20MB	32XX	87	9025	03	Storage 1MB	
08	9025	03	Timer		26	9025	03	Terminal Adpt	
09	9025	03	Ops Panel Adpt						

Select Test; press ENTER =====>_

PF: 3=Quit 12=Test Menu

Where:

HG = Hardware group
 TYPE = FRU Type number
 LC = FRU location
 SC = Status code This field contains a 32XX number only if a problem has occurred with a FRU during an IML.

Note: This table shows the configuration for Model 51R. Only those FRUs that are physically installed are displayed in this table.

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

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

Figure 2-25. Hardware Configuration Table

Test 3, Option 1

The following panel is displayed.

```

_____Status Summary - HG 26_____
Port      00 02 04 06 08 10 12 14 16 18 20 22 24 26 28 30
Address   01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31

Attach    m m m m m m m d                x M M M M M M m m m m m m m
Status    1 1 1 1 0 0 1 0 1 0 0 0 0 0 0 0 0 - - 1 0 s 1 1 0 1 0 0 1 0 0 1
Terminal  v v v v ? v v v p                p p v v v v v v v v i i v v v
Cable     . . . . . : . .                    . . | . . . . . . . . . .
Cable Max. . . . . * : . .                  . . : * . . : . . . . . : : *
Host      3 3 3 A      3 A 3                  3 3  x x 3      3
LU        + + +      + +                    +          +      +

d = direct      - = off(error)      i = DFT device      . = 0 errors
m = multiplexor x = unconfigured    ? = unknown        : = 1-5 err
1 = on          p = printer          + = in session     | = 6-15 err
0 = off         v = video display    3=3270  A=ASCII   * = > 15 err
                s = switched

Connection number: Outgoing call 999-555-1234

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

PF: 3=Quit                12=Test menu

```

Figure 2-27. Status Summary

Port Address: indicates the terminal port number.

For Models 1L through 13R, ports 00 – 31 are displayed.
 For Models 51R through 62R, ports 00 – 15 are displayed.
 For Models 81R through 92R, ports 00 – 07 are displayed.

Attach:

- d = The terminal is attached directly to the terminal adapter.
- m = The terminal is attached through a 3299 Terminal Multiplexer.
- M = A terminal that is attached to this controller through a 7232 Dual Control Unit Terminal Multiplexer.
- x = A terminal that is configured only for another controller through a 7232 Dual Control Unit Terminal Multiplexer. That terminal will not communicate with this 3174.
- ? = When displayed on this line under port 00, a question mark (?) means one of the following:
 - The controller has not communicated with a directly attached terminal.
 - The controller has not communicated with any of the terminals connected to a 3299.

Online Tests Configuration A5/S5

Status: Indicates one of the following conditions on the configured terminals at the time the test request was entered:

- 1 = The attached terminal is communicating with the 3174.
- 0 = The attached terminal is powered off or disconnected.
- = The terminal had been communicating with the 3174, but the terminal is now disabled from the controller because of errors. Run Test 1, Option 4 (Event Log) and check for any 2XX status codes logged against the port number that was disabled.
- s = The terminal is presently communicating with another controller through a 7232 Dual Control Unit Terminal Multiplexer, in other words, it is in the switched state.

Terminal: Indicates the type of device connected.

- ? = The device attached to this port has not been communicating with the 3174. The terminal on this port may not have been powered on.
To reset this condition at the terminal: Set the Normal/Test switch to Test and back again, or perform a power-on reset.
- v, p, or i = The display or video (v), printer (p), or DFT device (i) for this port has a known history of communicating with the 3174.

Note: If a terminal or multiplexer cable is disconnected and then reconnected, a terminal power-on reset is required to allow the 3174 to recognize the change. The terminal counter is reset by an IML, by a power-on reset on the attached terminal, or by online test 4.

Cable: Terminal errors that are caused by cable media-related problems are counted by the cable counter for each port address. The cable counters accumulate the number of cable transmission errors occurring in the most recent 30-minute time period. Every 30 minutes the cable counters are reset to 0 and error counting starts again. When any cable counter passes the threshold of 16 errors, status code 201 51 is recorded in the event log. The event log can be viewed to determine the number of cable errors that have occurred over an extended period of time. This log is displayed by using online test /1. The cable counters are also reset by an IML and online test /4 options 2 and 3. Individual cable counters are reset when the attached terminal is powered on.

Cable Max: The Cable Max counters retain the peak value attained by the Cable Threshold counters over an extended period. They are not reset every 30 minutes, but only are reset by IML and online test /4 options 2 and 3.

Host: This line represents the type of host to which a terminal is currently connected, or if no host is configured. For ports configured for Multiple Logical Terminals (MLT), a blank, 3, or A represents the primary logical terminal session only.

- Blank = No current host
- x = No host sessions configured
- 3 = 3270 host connection established
- A = ASCII host connection established.

LU: This line is present only for 3174s running SNA. It indicates whether the SNA session is bound and active. For MLT ports, the + is displayed if any SNA session is active.

Connection Number: This number is for X.21 or X.25 lines. One of the following messages can follow the connection number:

Outgoing Call, followed by the number being called. For X.25, the outgoing call number (or host DTE address) can be up to 15 digits long. For X.21, the outgoing call number can be up to 32 characters long, as entered on the dial terminal.

Direct Call (X.21 only).

Incoming Call followed by an optional number. For X.25, the Incoming Call or Host DTE Address can be up to 15 digits long. For X.21, the Incoming Call will be displayed.

Test 3, Option 2

The following panel is an example of the error counters for the port specified by the parameters.

```
_____Error Counters for PN 02, HG 26_____
Adapter (HG) status:           Disabled
Port (PN) status:             Powered off due to error
Error counters-
Poll time out:                10
Read time out:                10
Poll parity:                  10
Read parity:                  10
Coax threshold:               40
Max threshold:                75

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

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

Figure 2-28. Error Counters Example: Disabled Adapter and Disabled Port

Test 3, Option 3

The following panels are examples of connectivity. The status of the device determines which panel is displayed.

```

_____Connectivity for PN 11, HG 26_____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device Type               Video display (MLT)

Current connectivity--

   LT   LT Addr          HG_PN  Host/Station Name

   (No host connectivity configured)

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

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

Figure 2-29. Connectivity Example: Enabled Adapter and Host Unconfigured

```

_____Connectivity for PN 11, HG 26_____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device Type               Video display (MLT)

Current connectivity--

   LT   LT Addr          HG_PN  Host/Station Name
   1    111              11     3270 host
   2    n/a              21_02  Dow Jones
Active 3    n/a              22_07  The Source
   4                                not connected
   5    100              11     3270 host

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

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

Figure 2-30. Connectivity Example: Enabled Adapter and Live MLT Display

Test 4: Reset Logs and Cable Errors

Test 4 resets the response time logs, the event logs, traces, and cable errors. The menu shown in Figure 2-31 is displayed.

Warning: Do not select the options on this menu unless you want to reset all of your counters back to **zero**.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /4
3. Press ENTER.

```

                ____Reset Log Menu____

Option          Description

   1             Reset response time logs
   2             Reset event log, traces, and cable errors
   3             Reset cable errors

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

PF:  3=Quit                12=Test menu

```

Figure 2-31. Test 4 Menu

Option 1. Select option 1 on the Reset Log Menu to reset the response time log.

Option 2. Select option 2 on the Reset Log Menu to reset the event logs, traces, and cable errors.

Option 3. Select option 3 on the Reset Log Menu to reset only the cable errors.

Notes:

1. Cable errors can be reset on an individual port by performing a power-on reset on the terminal connected to that port.
2. To reset line errors on ASCII terminals, use Test 12, Option 3 or 4.

Test 5: Display Vital Data

Test 5: Controller information such as model number, serial number, and EC level is displayed. The menu shown in Figure 2-32 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /5
3. Press ENTER.

_____ Vital Data Menu _____	
Option	Description
1	Controller Vital Data
2,n,m	Port n vital data on HG m (n=0-31, m=21-23, 26)

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

PF: 3=Quit 12=Test menu

Figure 2-32. Vital Data Menu

Option 1. Select option 1 on the Vital Data Menu to display the Controller Vital Data panel. See Figure 2-33 on page 2-141.

Option 2. Select Option 2 to display the Port Vital Data panel. See Figure 2-34 on page 2-142.

Test 5, Option 1

The following panel is displayed.

```

          ___Controller Vital Data___

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:      01R      Active      Active
Controller ID:     1234567 Patches      RPQs
Microcode Release: A5.0
Maintenance Release: 89186   123456  112361  112371  8K125
IML Drive/Type:    01/41    112344  112362  012372  7L123

DSL Information:
3290 01.02 0000000000      112345  112373  112373  8K123
3179 01.00 0000000000      002222  012364  112374  8K123
9999 01.00 0000000000      112355  112365  112375  8K123
9998 01.00 0000000000      112356  002366  002376  8K123
          012357  112367  112377  8K124

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

PF: 3=Quit                      12=Test menu

```

Figure 2-33. Controller Vital Data

Note: If more than 30 patches are installed on the Control disk, PF8 = FWD will be displayed on this panel.

Help ## – This number is assigned by the customer in response to question 99 during customizing.

Model Number – The model number of the controller.

Controller ID – This ID is assigned by the customer in response to question 108 during customizing.

Microcode Release – This is the configuration support release and suffix level of the Control disk. A is the configuration support, 5 is the release level, and 0 is the suffix.

Maintenance Release – This is the year and Julian date that the microcode was released. 89 is the year, and 186 is the day in the year.

IML Drive/Type – This is the drive and the type of IML that was performed.

Drive Type

- 01 = Diskette drive 1
- 02 = Diskette drive 2
- 03 = Fixed disk drive 1
- 04 = Fixed disk drive 2.

IML Type

- 41 = Load production (default) operational microcode
- 42 = Load back level operational microcode
- 43 = Load trial operational microcode.

Active Patches – These are the patch ids that can be in effect for the current system configuration. Even though listed, a patch is only active if the configuration of the system allows the patch to function. A listed patch is not necessarily functional.

Active RPQs – These are the active RPQ ids that are in effect for the current system. Blank entries indicate no active RPQs.

DSL Information – This information describes one DFT device on each line. The terminal model type comes first, followed by the release level and suffix for the DFT microcode. The DFT RPQ is the last field. The syntax (the parentheses do not appear) is:

(Configuration level)(Release level)(Suffix level)(DFT RPQ)

Test 5, Option 2

Type **2,n,m** (n = port number, m = HG 21, 22, 23, or 26). The following panel is displayed.

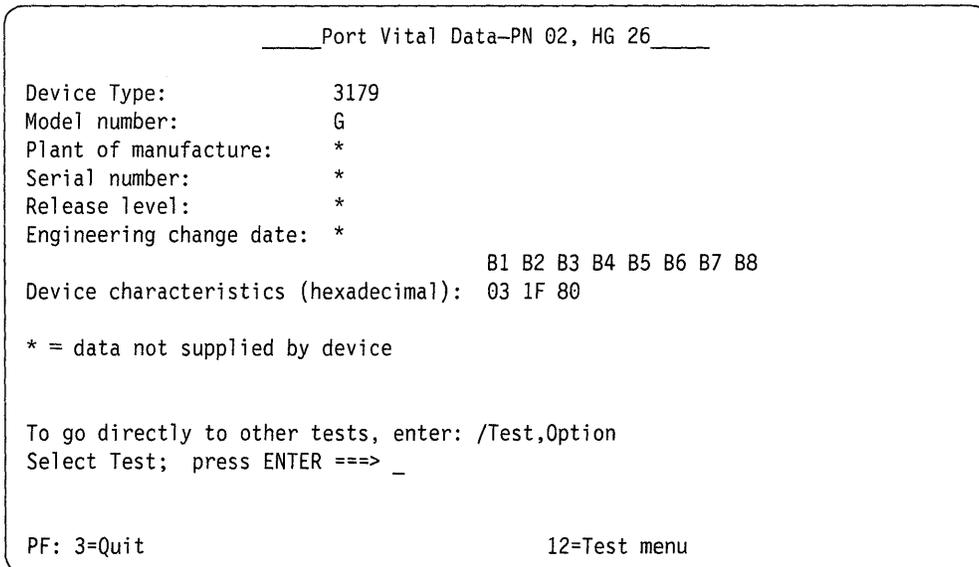


Figure 2-34. Port Vital Data

Test 6: Display Control Blocks

Test 6 provides the following information. Option 2 Port Control Area contains common subsystem information pertaining to all terminals and devices, and the Host Control Data (Option 3) contains information on the host adapter. In addition, limited device feature information is provided. Options 2 and 3 represent the most current information about a specific device, and should be checked when it is necessary to determine specific device parameters, such as:

- Type and feature information for attached terminals.
- Is the display screen size correctly specified?
- Is a modified data tag (MDT) bit set?
- The type of keyboard for a specific terminal.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/6**
3. Press ENTER.

___Display Control Blocks Menu___	
Option	Description
1,n	Register page n (n=0-3F)
2	Port control area (Requestor's Port)
2,n,m	Port n control area on HG m (n=0-31 m=21-23,26)
3	X.21 SHM / X.25 Host Control Data

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

PF: 3=Quit 12=Test menu

Figure 2-35. Test 6 Menu

Option 1,n Register page n (n=0—3F).

Option 2 Port control area for the requesting terminal is displayed.

Option 2,n,m. Select option 2,n,m to display the port control area for the terminal on port n of hardware group m. An example of the Port Control Area panel is shown in Figure 2-36 on page 2-144. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-37 on page 2-145 for an example of an LT Control Area panel.

Option 3. Select option 3 on the Display Control Blocks Menu to display the host control data on controller that are configured for X.21 or X.25. Figure 2-38 on page 2-151 shows the host control data for X.21 short-hold mode. Figure 2-39 on page 2-153 shows the host control data for X.25.

Note: This option only shows the correct XIDs sent and received during an X.21 short-hold mode session. XIDs exchanged before an SHM session is established are not included in the host control data.

Test 6, Option 2

The following panel will display information about your terminal.

Port Control Area - PN 17, HG 26								
	0	2	4	6	8	A	C	E
00	1111	2222	3333	4444	1111	2222	3333	4444
10	0000	1234	1234	1234	1234	1234	1234	1234
20	1234	1234	1234	1234	1234	1234	1234	1234
30	1234	1234	1234	1234	1234	1234	1234	1234
40	1234	1234	1234	1234	1234	1234	1234	1234
50	1111	2222	3333	4444	1111	2222	3333	4444
60	0000	1234	1234	1234	1234	1234	1234	1234
70	1234	1234	1234	1234	1234	1234	1234	1234
80	1234	1234	1234	1234	1234	1234	1234	1234
90	1234	1234	1234	1234	1234	1234	1234	1234
A0	1234	1234	1234	1234	1234	1234	1234	1234
B0	1111	2222	3333	4444	1111	2222	3333	4444
C0	1234	1234	1234	1234	1234	1234	1234	1234
D0	1234	1234	1234	1234	1234	1234	1234	1234
E0	1234	1234	1234	1234	1234	1234	1234	1234
F0	1111	2222	3333	4444	1111	2222	3333	4444

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

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

Figure 2-36. Port Control Area Panel

Note: To analyze the information contained on this panel, see “Port Control Area Bit Definitions” on page 2-146.

Type 2,n,m

The following panel will display information for the logical terminal specified by the parameter values.

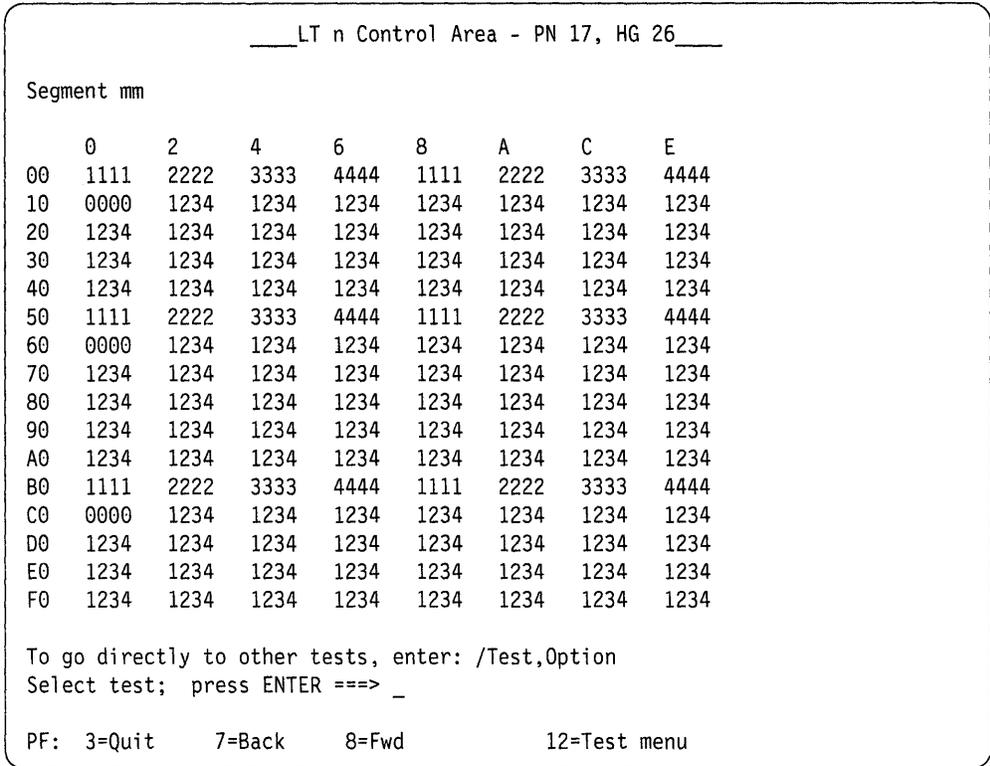


Figure 2-37. LT Control Area Panel

Where:

- n = blank, non-MLT device
- n = 1–5, logical terminal number of the MLT device for which the data on the panel applies
- mm = segment number of the current panel.

Note: To analyze the information contained on this panel, see “LT Control Area Bit Definitions” on page 2-148.

Port Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bits are assumed to be set to B'1' unless otherwise noted.

Table 2-21 (Page 1 of 2). Port Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
Byte 4	0-1	Reserved	
	2	Op Complete pending from device	
	3	Selector Pen retry processing	
	4	Stacked status/keystroke/error	
	5-6	Reserved	
	7	Print ID entry mode	
	Byte 05	0	Attached to a 7232 dual control unit terminal multiplexer
1		Attached to a 7232 dual control unit terminal multiplexer - switched to other CU	
2-5		Reserved	
6		Reserved	
7		Port timer enabled	
Byte 06		0-2	Reserved
		3	Reserved
	4	APL ROS installed	
	5-6	Number of PS Sets 00 = 0 01 = 2 10 = 4 11 = 6	
	7	Color device	
	Byte 07 ¹	0	Printer
		1	CUT display
2		DFT device	
3		MLT device	
4		Reserved	
5		Reserved	
6		Display HAP	
7		Reserved	
Byte 08	0	1 = 3278 mode 0 = Native mode	
	1	1 = Numeric lock 0 = No numeric lock	
	2	1 = Keyboard functions have been redefined 0 = No modifiable keyboard-Keyboard functions have not been redefined	
	3-7	Modifications keyboard ID Bit 2-0 Bit 2-1 00000 Reserved Reserved 00001 Typewriter A 00010 Data Entry 1 B 00011 APL C 0100 Reserved D through 11111	
	Byte 09 ¹ (Display)	0-3	0000 - Reserved 0001 - APL keyboard/numeric lock 0010 - Text keyboard/numeric lock 0011 - RPQ typewriter keyboard/numeric lock

¹Actual features identified to the 3174 by the terminal.

Table 2-21 (Page 1 of 2). Port Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
4-6	0100	Typewriter Attribute Select keyboard/numeric lock	
	0101	APL keyboard	
	0110	Text keyboard	
	0111	APL Attribute Select keyboard	
	1000	Data Entry 2 keyboard/numeric lock	
	1001	Data Entry keyboard/numeric lock	
	1010	Typewriter/numeric lock	
	1011	Reserved	
	1100	Data Entry 2 keyboard	
	1101	Data Entry 1 keyboard	
	1110	Typewriter	
7	001	Model 1	
	010	Model 2	
	011	Model 3	
	100	Escape	
	101	Reserved	
	110	Model 5	
	111	Model 4	
0	indicates display byte		
Byte 09 ¹ (Printer)	0	ECS feature present	
	1	APL feature present	
	2	Reserved	
	3	Reserved	
	4-6	001 - Model 1 010 - Model 2 011 - Model 3	
	100	Reserved	
	101	Reserved	
	110	Model 5	
	111	Model 4	
	1	Indicates printer byte	
	Byte 0A ¹ (Display)	0	Reserved
1		Security key	
2		Selector light pen	
3		Reserved	
4		Magnetic slot reader	
5		Reserved	
6		Extended function buffer	
7		ECS adapter	
Byte 0B ¹	0-2	Reserved	
	3	Color	
	4	Display HAP present	
	5-7	Reserved	
Byte 0F	Port Number		
	00-1F	TA ports 0-31	
	20-27	AEA 1 ports 0-7	
	28-2F	AEA 2 ports 0-7	
	30-37	AEA 3 ports 0-7	
Bytes 18-1B.	Device Type in EBCDIC (F0F0F0F0 if not known)		

¹Actual features identified to the 3174 by the terminal.

Table 2-21 (Page 2 of 2). Port Control Area Bit Definitions		
Location	Bit	Meaning if Bit Is Turned On
Byte 1C		Additional Information (00 if not known)
	0-3	= E = Programmable device = 1 = Hardware or Microcode product
	4-7	= 1 = IBM Product = 9 = Non-IBM Product
Bytes 1D-1F		Model in EBCDIC (000000if not known)
Bytes 20-21		Plant of Manufacture in EBCDIC (0000 if not known)
Bytes 22-28		Serial number in EBCDIC (00000000000000 if not known)
Bytes 29-2B		Release level in EBCDIC (0000000 if not known)
Bytes 2C-3B		Addition level information (00.....00 if not known)
Byte 3C		2NN
Byte 3D		3NN
Byte 85	0-3	Reserved
	4	Monocase switch active in device
	5	Clicker enabled
	6	CECP Enabled
	7	Device CECP capable
Byte 86		Number of sessions configured for a port
Byte 8C	1	Multiple display sessions on display
Byte 8D	0	Reserved
	1	VPD Support
	2-6	Reserved
	7	0 = Converged keyboard present 1 = Enhanced keyboard present
Byte 93	5	Shared mode printer
	6	Local mode printer
	7	System mode printer
Byte EC	0	ASCII connection for ASCII terminal or ASCII printer available
	1	ASCII host connection valid on this port
	2	AEA port configured as switched
	3-4	Reserved
	5	AEA line trace running

¹Actual features identified to the 3174 by the terminal.

LT Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bytes 04 and 06 indicate functions supported by the controller and reported as available by the device.

Table 2-22 (Page 1 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
Byte 04	0-2	Value Model Buffer Size
		000 - Reserved
		001 1 960 (480)
		010 2 1920(1920)
		011 3 2560 (1920)
		100 - Reserved
		101 - Reserved
		110 5 3564 (1920)
	3	0= Display 1= Non-Display
		11 Printer
	3-4	01 Data Entry Display
		10 None of the others
	4	00 Typewriter Display
0= Escape 1= Printer		
5 SOEMI printer present		
5-7		BREG printer present
Byte 05	0	Katakana keyboard attached
	1	SCS feature installed on printer
	2	Text keyboard
	3	3289 text feature
	4	APL keyboard
	5	Extended keyboard function
	6	Printer supports extended LU1 data stream with SNA FM headers
	7	DFT session
Byte 06	0	Not used
	1	Security keylock present
	2	Selector pen attached
	3	Reserved
	4	MSR/MHS attached
	5	Reserved
	6	3180 in model 6,7,8, or 9 mode
	7	ECS (APL/Text)
Byte 07 ¹	0-2	Reserved
	3	Color
	4	Display HAP Supported
	5-7	Reserved
Byte 08	0	Reserved for engineering use
	1	Device to CU connection active
	2-5	Reserved
	6	Numeric lock field
	7	Reserved for engineering use
Byte 09	0	Protected field or attribute character
	1-4	Reserved for engineering use
	5	Keyboard inhibited
	6	Reserved for engineering use
	7	Insert mode

¹Features supported and reported as available by the device associated with the LT Control Area.

²When using this byte, subtract hex 50. This will give you presentation space address origin 0.

³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-22 (Page 1 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
Byte 0A	0	Reserved
	1	Test mode
	2	Alpha shift (not Katakana shift)
	3	Reserved for engineering use
	4	Text indicator
	5	Upshift indicator
	6	Katakana shift
	7	APL indicator
Byte 0B	0	Online indicator
	1	System wait condition
	2	Hard lock condition
	3	Keyboard in use by operator
	4-7	Reserved for engineering use
Byte 0D	0	Reserved for engineering use
	1	Color override
	2	Reserved for engineering use
	3	Host-initiated local copy request
	4	Alternate screen size
	5	Attributes not valid
	6	Reserved for engineering use
	7	X.21/X.25 Primary dial terminal
Byte 0E	0-1	Reserved for engineering use
	2	Print failure indicator
	3	Go elsewhere
	4	Minus function
	5	Wrong card
	6	Message pending
	7	Message reminder
Byte 0F	0	Printer printing - local copy
	1	If display has printer assigned for local copy
	2	Printer matrix changed (associated with this display)
	3-7	Reserved
Byte 10	0	Invalid dead key
	1	2NN machine check
	2	Communication check
	3	Program check
	4	Security key off
	5	3NN machine check
	6	Too much data entered
	7	Operator not authorized
Byte 11	0	Not enough data entered
	1	Wrong number
	2	Numeric shift
	3	Operator retry
	4	Device not functional
	5	Device busy doing local copy

¹Features supported and reported as available by the device associated with the LT Control Area.

²When using this byte, subtract hex 50. This will give you presentation space address origin 0.

³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-22 (Page 2 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	6	X.21/X.25 operator communication
	7	System lock (X-System)
Byte 12	0	Communication check reminder
	1	My job indicator
	2	System operator indicator
	3	Unowned indicator
	4	Not enabled (not online)
	5	Reserved for engineering use
	6	Reserved for engineering use
	7	Minus symbol indicator (WT)
Byte 13	4	PU not active
Bytes 16 – 17		Cursor position (CUT display only) ²
Bytes 1A – 1B		First character on display ²
Bytes 1C – 1D		Last character on display ²
Byte 24	0	Model 5 wide screen
	1	Model 5 wide screen
	2	Reserved
	3	Reserved for engineering use
	4	Inhibit display video
	5	Blank cursor
	6	Cursor reverse
	7	Cursor blink
Byte 25	3	APL mode
	4	APL attached
Byte 26		Row length
Byte 27		Indicator row length (if printer then PCIA length)
Byte 29		AID Code
Byte 33		Printer buffer size 08 = 2K 10 = 4K 20 = 8K
Byte 36	0	Printer allocated to local copy
	1	SNA – local copy printer allocated to host
	2	SNA – host request for local copy allocated printer
	3	Alternate row length
	4	Default row length indicator
	5	Reserved for engineering use
	6	SNA – LU in ERP state
	7	SNA – Host communication disabled (LU active)
Byte 37	0	Local copy printing (host-initiated)
	1	Local copy printer available (display only)

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-22 (Page 2 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	2	Local copy (printer available for next message) SNA
Byte 3C		Reserved
Byte 3D		Reserved
Byte 3E		4NN (Program check number)
Byte 3F		5NN (Communication check number)
Byte 4A	0	Reserved
	1	Selector pen for immediate defect field
	2	Request for select pen field
	3	Reserved for engineering use
	4	Reserved for engineering use
	5	Reserved
	6	Reserved
	7	Reserved for engineering use
Byte 4B	0	Disable cursor display
	1	Reserved for engineering use
	2	Second local copy requested
	3	Local copy busy
	4	Reserved for engineering use
	5	Dead key sequence in progress
	6	Local copy received IR
	7	Reserved for engineering use
Byte 4C	0	Device attached to CU VIA AEA adapter
Byte 52	0 – 7	Attribute affecting field cursor ³
Byte 53	0 – 7	Current extended field attribute
Bytes 54 – 55		Present attribute address ²
Bytes 56 – 57		Next attribute address ²
Byte 68	0	Printer equipment check/display disabled error
	1	Intervention required
	2	Printer busy processor abort
	3	Reserved for engineering use
	4	Print in process
	5	Start printing pending
	6	Printer disabled
	7	Reserved for engineering use
Byte 6A	0	Shift/numeric lock key still depressed
	1	Alpha key depressed
	2	Alternate shift key depressed
	3	Shift/numeric lock key in effect
	4	Left shift key
	5	Right shift key
	6	Katakana shift key was pressed
	7	APL key select APL mode

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-22 (Page 3 of 3). LT Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
Byte 6B	0	Reserved for engineering use	
	1	Local copy being printed	
	2	Reserved for engineering use	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6-7	Reserved for engineering use	
Byte 70		Local copy printer ID	
Byte 71		Local copy printer address	
Bytes 72-73		Printer DCB devices 0 - 15, ones in this field are authorized to use this printer	
Bytes 74-75		Printer DCB devices 16 - 31 (same as Bytes 72, 73 description)	
Bytes 76-77		Printer class assignments (printer only) 1 in one or more bits (0-15) represents printer class assignments 70-85	
Byte A0		WCC save area	
Byte AE	0	LU active	
	1	Device is bound	
	2	Start data traffic (DFT - pending bind response)	
	3	Outbound pacing ind (DFT - pending unbind response)	
	4-6	Half-duplex FSM	
		000	Send state
		001	Pending send
010		Pending receive	
	101	Contention	
	111	Receive	
7		Error pending (response sent)	
Byte AF	0-3	Bracket state mach	
		0000 = Between brackets	
		1111 = In brackets	
		0001 = Pending in brackets	
		0010 = Pending begin bracket	
		0011 = Pending between bracket-EC received	
		0100 = Pending between bracket-EC sent	
		0101 = Pending between bracket-response received	
		0110 = Pending between bracket-response sent	
		0111 = Pending between bracket-purge received	
		1000 = Pending between bracket-receive	
		1001 = Pending between bracket-purge sent	
	4	0 = Send between chain	

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-22 (Page 3 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	5-6	1 = Send in chain
		Chain receive
	7	00 = Receive between chain
		01 = Receive in chain
11 = Receive purging chain		
Byte B0	5	Crypto inbound padding indicate
	6	End chain receive
	6	0 = Outbound segmenting between BIU 1 = Outbound segmenting in BIU
Byte B1	4	0 = Not last buffer in this RU 1 = Last buffer in this RU
	5	First buffer in RU
Byte B5	0-7	LU type bound (01,02,03)
Byte B6	0-7	Printer outbound pacing count
Bytes DC-DD		Default screen size
Bytes DE-DF		Alternate screen size
Byte F3	0	LT trace enabled

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Test 6, Option 3

Figure 2-38 shows the information for X.21 short-hold mode.

```

_____X.21 /X.25 SHM Host Control Data_____
      0      2      4      6      8      A      C      E
00    0000  0000  0000  0000  0000  0000  0000  0000
10    uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu
20    uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu  uuuu
30    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
40    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
50    xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx  xxxx
60    xxxx
70
80
90
A0
B0
C0
D0
E0
F0

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

PF: 3=Quit                      12=Test menu

```

Where:

uuuu = XID sent by the 3174 (comes from configured data)

xxxx = XID received by the 3174 on a reconnection

Figure 2-38. X.21 Short-Hold Mode Host Control Data

The configured XID (the one sent to the host at start time) and the last reconnect XID (the last one sent to the host during an SHM session) are displayed. If, for example, a normal X.21 host connection should be established following an SHM connection, the XID displayed by /6,3 would be for the last SHM connection. Bit 6 (SHSI) in the XID sent indicates short hold mode is active: it is not sent on with the initial XID; it is sent during a reconnection. This bit is turned on after an SNRM (Set Normal Response Mode) has been received. Table 2-23 on page 2-152 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-38.

Table 2-23. X.21 XID Summary		
Location	Bit	Meaning
Byte 00 ¹	0-3	Format of XID I-field and PU type of Format of XID I-field. 0 = fixed format; bytes 00-05 used 1 = variable format; bytes 0-P are used
		4-7
Byte 01		Length in hexadecimal of the variable format XID I-field. This byte is reserved in a fixed format XID.
Bytes 02-07 ²		Node identification
Bytes 02-05	0-11	The product block number.
	12-31	The SDLC ID.
Bytes 06,07		Reserved
Byte 08		Link-station and connection protocol flags
	0-1	Reserved
	2	Link station role of XID sender 0 = Sender is a secondary link station 1 = Sender is a primary link station
	3	Reserved
	4-7	Link station transmit/receive capability 0 = two way alternating 1 = two way at the same time
Byte 09		Node characteristic of the XID sender
	0	PU capability to receive FMD requests 0 = PU cannot receive FMD requests from the SSCP 1 = PU can receive FMD requests from SSCP
	1	Reserved
	2-3	Segment assembly capability of the nodes PC element 00 = The mapping field is ignored and PUIs are forwarded unchanged 01 = Segments are assembled on a link station basis 10 = Segments are assembled on a session basis 11 = Only whole BIUs are allowed

¹Byte 00 = 12 for 3174 variable format XIDs

²Bytes 2-7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved

³Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Table 2-23. X.21 XID Summary		
Location	Bit	Meaning
	4-5	Reserved
	6 ³	Short hold status indicator (SHSI) 0 = Not already engaged in a SHM session 1 = Engaged in a SHM session
	7	Short hold indicator (SHI) 0 = Short-hold mode not supported 1 = Short-hold mode supported
	Byte 10	Maximum I field length the XID sender receives
	0	Format flag (always 0)
	1-15	Maximum I (field length)
Byte 12	0-3	Reserved
	4-7	SCLC command/response profile 0 = SNA link profile (only value)
Byte 13	0-1	Reserved
	2	SDLC initialization mode options 0 = SIM and RIM not supported 1 = SIM and RIM supported
	3-7	Reserved
	Byte 14-15	Reserved
Byte 16	0	Reserved
	1-7	Maximum number of I frames that can be received by the XID sender before an ACK is sent
Byte 17		Reserved
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.

¹Byte 00 = 12 for 3174 variable format XIDs

²Bytes 2-7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved

³Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.

Type 3 to select option 3 from the Display Control Blocks Menu. The following panel shows the information for X.25.

X.21/X.25 Host Control Data								
	0	2	4	6	8	A	CE	
	0000	0000	0000	0000	0000	0000	0000	0000
00	iiii							
10	iiii							
20	iiii	iiii	xaxb	xxxx	xxxx	xxxx	xxxx	xxxx
30	xxxx							
40	xxxx	xxxx	xxxx	rrrr	xxxx	xxxx	rrrr	rrrr
50	zzzz	zzzz	zzzz	zzzz	rrrr	zzzz	zzzz	zzzz
60	rrrr							
70								
80								
90								
A0								
B0								
C0								
D0								
E0								
F0								

To go directly to other tests, enter: /Test,Option
 Select Test; press ENTER ==> _
 PF: 3=Quit 12=Test menu

Where:

iiii = Reserved for engineering use
 xxxx = 2-byte link counter
 xaxb = 2-byte link counter used in the example below
 zzzz = 2-byte circuit counter
 rrrr = Reserved

Figure 2-39. X.25 Host Control Data

Use the following example to determine how to locate a particular byte and the information following the example for descriptions of the link and circuit counters. The bytes are described in Table 2-23 on page 2-152, "Link Counters" on page 2-154, and "Circuit Counters" on page 2-154.

Example

To locate bytes 24 and 25:

1. Use the high-order digit 2. Scan down the column of numbers in the left margin of the panel. Find address 20.
2. Use the low-order digit 4. Scan left to right in the row of data next to address 20. Find the data under column number 4. Byte 24 contains xa; byte 25 contains xb.

Link Counters

- Bytes 24, 25 = The number of Information (I) frames sent by the 3174.
- Bytes 26, 27 = The number of Information (I) frames received by the 3174.
- Bytes 28, 29 = The number of Receiver Ready (RR) frames sent by the 3174.
- Bytes 2A, 2B = The number of Receiver Ready (RR) frames received by the 3174.
- Bytes 2C, 2D = The number of Receiver Not Ready (RNR) frames sent by the 3174.
- Bytes 2E, 2F = The number of Receiver Not Ready (RNR) frames received by the 3174.
- Bytes 30, 31 = The number of Reject frames sent by the 3174.
- Bytes 32, 33 = The number of Reject frames received by the 3174.
- Bytes 34, 35 = The number of I-frames that were retransmitted by the 3174.
- Bytes 36, 37 = The number of I-frames that were received by the 3174 with Frame Check Sequence (FCS) errors.
- Bytes 38, 39 = The number of receive errors detected by the 3174.
- Bytes 3A, 3B = The number of cycle steal underruns detected by 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 = A valid frame has not been received within the time limit specified during configuration.
- Bytes 48, 49 = The number of call attempts counted by the 3174.

Circuit Counters

- Bytes 50, 51 = The number of Data packets sent by the 3174.
- Bytes 52, 53 = The number of Data packets received by the 3174.
- Bytes 54, 55 = The number of Receiver Ready packets sent by the 3174.
- Bytes 56, 57 = The number of Receiver Ready packets received by the 3174.
- Bytes 5A, 5B = The number of Receiver Not Ready packets sent by the 3174.
- Bytes 5C, 5D = The number of Interrupt packets sent by the 3174.
- Bytes 5E, 5F = The number of Interrupt packets received by the 3174.

Test 7: Color Convergence

Test 7 performs color convergence on 3279 color display stations. For a description of this procedure, see the appropriate display station problem determination manual.

Note: No PF keys are provided for this test to return to the Test Menu. To bring up the Test Menu after performing the test, press the CLEAR key.

Test 8: Extended Functions and Programmed Symbols

Test 8 checks the programmed symbols (PS) and color for any device that uses PS or color. For a description of this procedure, see the appropriate display station problem determination manual.

Test 9: Display the Token-Ring Test Menu

Test 9 provides a test facility to check the status of the Token-Ring, the Token-Ring adapter, and attached links. To select one of the test options from the Token-Ring Test Menu, perform the following at any 3278 or similar display station.

Note: Test 9,1 can only be performed from one terminal at a time.

1. Press and hold ALT; press TEST
2. Type in /9
3. Press ENTER; the Token-Ring Test Menu is displayed.
4. Type in a test option number and press ENTER.

_____ Token-Ring Test Menu _____	
Option	Description
1	Monitor Token-Ring status
2	Display Token-Ring adapter status summary
3	Reset Token-Ring adapter status counters
4	Display link status summary for all links
5,n	Display link status summary for link address n
6	Reset link status counters for all links
7,n	Reset link status counters for link address n
8	Display Gateway host status summary
To go directly to other tests, enter: /Test,Option	
Select Option; press ENTER ==> _	
PF: 3=Quit	12=Test menu

Figure 2-40. Token-Ring Test Menu

- Option 1.** Monitor Token-Ring Status. See Figure 2-41 on page 2-157.
- Option 2.** Display Token-Ring status summary. See Figure 2-42 on page 2-158.
- Option 3.** Reset the Token-Ring adapter status counters.
- Option 4.** Display link status for all links. See Figure 2-43 on page 2-160
- Option 5.** Display the link status counters for the 6 links starting with the link selected in the test request. A 7-byte link address is required for this test. The address is a 6-byte Token-Ring adapter address followed by the 1-byte link station service access point (SAP) address.
- Option 6.** Reset link status counters for all links.
- Option 7.** Reset the link status counters for the link selected in the test request.

Option 8. The number of customized links and host address ranges is displayed. For each customized link, it will display the host address, the host link status, and the Token-Ring address. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.) See Figure 2-44 on page 2-164 for an example of the Gateway Host Status Summary panel.

Note: Option 8 is only available on those controller units with the Gateway feature. The feature is available on Models 1L, 1R, 2R, 11L 11R, 12R, 51R, 52R, 61R, and 62R.

Test 9, Option 1

The following panel is displayed.

```

_____Token-Ring Status_____

4697 - Local Token-Ring Adapter closed

4691 - Signal Loss (Adapter not detecting ring signal)

4692 - Hard Error (Adapter detecting a beacon condition
        either internally or receiving a Beacon MAC frame)

4693 - Wire Fault (Adapter has detected a wire fault
        and de-inserts)

4694 - The test has been active for 00000 minutes.

4695 - The test will terminate in n minute(s)
        Press PF9 to continue for another 10 minutes.

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

PF: 3=Quit          9=Cont          12=Test menu

```

Figure 2-41. Token-Ring Status (Example showing messages that could occur)

- 4697** - Indicates that the Token-Ring adapter is closed.
- 4691** - Appears when the Token-Ring adapter detects a signal loss condition on the ring.
- 4692** - Appears when the Token-Ring adapter detects a beaconing condition.
- 4693** - Appears when the Token-Ring adapter detects a wire fault (open or short) condition on its own lobe.
- 4694** - Indicates the amount of time that has elapsed from the start of the ring status test.
- 4695** - Appears when the test has been running for 10 minutes. The test runs for another 5 minutes and terminates automatically, unless PF9 is pressed. If PF9 is pressed within the 5-minute time frame, the test runs 10 or more minutes and 4695 is displayed again.
- 4698** - Appears when the Token-Ring adapter is open.

Test 9, Option 2

The following panel is displayed.

```

_____Token-Ring Adapter Status Summary_____
Adapter Address - XXXXXXXXXXXXX Adapter Status - Open
Customized Links - XXX Active Links - XXX

Counters Overflow
Line Errors XXXXXXXX 0
Internal Errors XXXXXXXX 0
Burst Errors XXXXXXXX 0
ARI/FCI Errors XXXXXXXX 0
Abort Delimiters XXXXXXXX 0
Lost Frames XXXXXXXX 0
Receive Congestion XXXXXXXX 0
Frame Copied Errors XXXXXXXX 0
Frequency Errors XXXXXXXX 0
Token Errors XXXXXXXX 0

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

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

Figure 2-42. Token-Ring Adapter Status Summary

- **Adapter Address** - This is the 6-byte Token-Ring address of the Token-Ring adapter set up when the controller unit was configured, followed by a 1-byte service access point address (SAP).
- **Adapter Status** - This shows the Token-Ring adapter's physical state relative to the Token-Ring (opened or closed).
- **Customized Links** - The number of links identified during configuration of the Control diskette. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.)
- **Active Links** - The number of the links active at the time the test request was entered.

Line errors - This counter is increased when a frame is copied or repeated by the protocol handler, the error detect indicator is zero, and one of the following conditions exists:

- A code violation exists between the starting delimiter and the ending delimiter of a frame.
- A code violation in a free token.
- A frame check sequence error is a format type 1 frame.

Internal errors - This counter is increased when the controller recognizes an internal Token-Ring adapter error. These errors indicate the Token-Ring adapter is in a marginal operating condition.

Burst errors - This counter shows the number of burst interrupts from the protocol handler. The burst error counter indicates the number of frames that are in error due to noise on the ring.

Address Recognized Indicator/Frame Copied Indicator (ARI/FCI) - This counter is increased when the Token-Ring adapter receives a frame back that has the address recognized and/or the frame copied bit not set. This error is due to the receiving station having no buffers available, or a wrong address received (line hit), or the ARI/FCI bits could not be set.

Abort Delimiters - This counter is increased when the Token-Ring adapter transmits an abort delimiter. This occurs with internal Token-Ring adapter errors.

Lost Frames - This counter is increased when the Token-Ring adapter is in transmit mode and fails to receive the frame it transmitted.

Receive Congestion - This counter is increased when the Token-Ring adapter is busy and recognizes a frame addressed to it, but cannot receive the frame because of insufficient buffer space.

Frame Copied Errors - This counter is incremented when the Token-Ring adapter sees a frame with its own address and the ARI or FCI bit is set on. This indicates that another device or controller may be attached to the ring that has a duplicate address.

Frequency Errors - This counter is increased when the Token-Ring adapter detects an excessive difference between the ring data frequency and the Token-Ring adapter's frequency oscillator.

Token Errors - This counter is increased when the active monitor function detects an error with the token protocol. These errors indicate another device or controller is not following normal token protocols.

Test 9, Option 4

The following panel is displayed.

```

      _____ Link Status Summary _____

Link Address  XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX
Primary/Secondary      XX/XX          XX/XX          XX/XX
Trans I-Frames  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Rec I-Frames    XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Transmit Errors  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Received Errors  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
T1 Expired      XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Com/Res Ind     XX YY          XX YY          XX YY

Link Address  XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX

Primary/Secondary      XX/XX          XX/XX          XX/XX
Trans I-Frames  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Rec I-Frames    XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Transmit Errors  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Received Errors  XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
T1 Expired      XXXXXXXXX - 0   XXXXXXXXX - 0   XXXXXXXXX - 0
Com/Res Ind     XX YY          XX YY          XX YY

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

PF: 3=Quit      7=Back      8=FWD          12=Test menu
    
```

Figure 2-43. Link Status Summary

The link status summary screen shows the link address, the data link control (DLC) primary and secondary states, the command/response indicator, and the logical link station counters.

Link Address - This is the station address assigned to each link during configuration. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Trans I-Frames - This counter shows the number of Information format LPDUs that have been sent, including all retransmissions. The actual counter for the link is reset when there is an overflow of any counter, or whenever the link is initialized.

Rec I-Frames - This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors - This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Receive Errors - This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired - This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

Com/Res Ind - XX indicates the last command/response received. ZZ indicates the last command/response sent.

Primary/Secondary - These are the SDLC primary and secondary states for the link station,

Where:

Primary State	Secondary State
80 Link Closed	80 Checkpointing
40 Disconnected	40 Local busy (operator)
20 Disconnecting	40 Local Busy (buffer)
10 Link Opening	10 Remote Busy
08 Resetting	08 Rejection
04 Frame Reject Sent	04 Clearing Algorithm Running
02 Frame Reject Received	02 Dynamic Window
01 Link Opened	01 Reserved

Note: The primary states are mutually exclusive. The secondary states are not mutually exclusive.

Primary States

The following paragraphs describe the Token-Ring adapter link primary states.

Link Closed

The link closed state is entered in the following cases:

- A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission will complete when the transmission completes.
- A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.
- A Reset command has been received, but a transmission has already been queued to the hardware, or an ARB request or SSB response has been queued to the controller and must complete before the link station control block can be released.

No commands are accepted while the Token-Ring adapter is in the link closed state. All received frames are ignored.

Disconnected

The disconnected state is entered in the following cases:

- Acceptance of an Open Station SRB
- Acceptance of a SABME for a previously nonexistent station
- Receipt of a DISC command or a DM response from the paired station
- When the retry count has been exhausted due to time-outs.

In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

The following SRBs are accepted:

Close station SRB	- Transition to link closed.
Connect station SRB	- Transition to link opening.

Disconnecting

The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state may also be entered on expiration of the retry count in FRMR received. This state is maintained until one of the following occurs:

- Either a UA or DM response is received to the transmitted DISC command.
- A SABME command is received and a DM response has been transmitted.
- The retry count expires.

There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting is to disconnected. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The token-ring adapter exits this state to the link is nonexistent or the link is closed. Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

Link Opening

The Token-Ring adapter enters the link opening state when the controller accepts a Connect station SRB.

Resetting

The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The Token-Ring adapter reports receipt of the SABME command to the controller unit using a DLC Status ARB indicating a SABME command was received and the Station ID of the affected station. In this state, the Token-Ring adapter accepts the following SRBs:

Close Station SRB - Transition to the disconnecting state.

Connect Station SRB - Transition to the link opening state.

All incoming frames are ignored except the following:

DISC - Transmit UA, transition to the disconnected state.

DM - Transition to the disconnected state.

FRMR - Transition to FRMR received.

SABME - The Token-Ring adapter informs the controller.

Frame Reject Sent

When the Token-Ring adapter transmits a Frame Reject (FRMR) because of the receipt of an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.

Connect station SRB - Transition to the link opening state.

All incoming frames except the following are ignored except that FRMR response final will be transmitted in response to command polls:

SABME - Transition to the resetting state.

DISC - Transition to the disconnected state.

DM - Transition to the disconnected state.

FRMR - Transition to the FRMR received state.

Frame Reject Received

When the Token-Ring adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The Token-Ring adapter then enters the FRMR received state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

In this state, all frames except the following are ignored:

SABME - Transition to the resetting state
DISC - Transition to the disconnected state
DM - Transition to the disconnected state.

Link Opened

The link opened state is entered from link opening after the SABME-UA exchange which completes the connection protocol. This is the only state in which information transfer is allowed and in which transmit SRBs are accepted. In this state, the Token-Ring adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

If the primary state is changed from link opened because of receipt of a frame such as SABME or FRMR, or because the retry count has been exhausted, any outstanding Transmit requests are returned to the controller by using a single Transmit SSB. If the primary state is changed because of a user command such as Close station, outstanding Transmit requests are not returned.

Secondary States

The following paragraphs describe the Token-Ring adapter link secondary states.

Checkpointing

A poll is outstanding. I-frame transmission is suspended.

Local Busy (User)

A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.

Local Busy (buffer)

An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.

Remote Busy

An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.

Rejection

An out of sequence I-frame has been received and a REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.

Clearing

A poll is outstanding and a confirmation of clearing Local Busy is required after the response is received.

Dynamic Window

A remote station on another ring is connected through a bridge to the local ring and there appears to be congestion through the bridge(s).

Test 9, Option 8

The following panel is displayed.

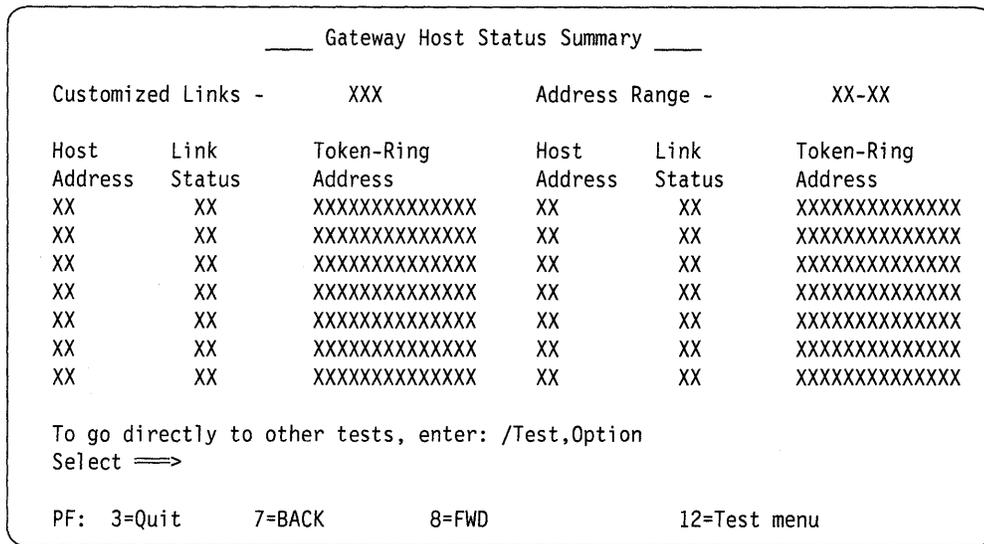


Figure 2-44. Gateway Host Status Summary

The Gateway Host Status Summary panel shows information on the links and addresses, and the status of the links.

Customized Links - The number of links declared at customizing time if storage was available to support them or the maximum number of links possible in the storage available (this field reflects the downgraded configuration). This field reflects one link for the local PU.

Address Range - The host address range declared in customizing. This field reflects the downgraded condition.

Host Address - The address assigned each link during customizing

Link Status - The 2-digit status code representing the status of the link:

For Model 1L and 11L:

- 00 = The Token-Ring attached physical unit is in disconnect mode
- 02 = The Token-Ring attached physical unit is connected.

For Models 1R, 2R, 11R, 12R, 51R, 52R, 61R, and 62R

- 00 = SNRM required
- 01 = SNRM received
- 02 = Connected/active
- 03 = Poll timeout.

Token-Ring Address - The station address assigned to each link during customizing. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Test 10: Port Wrap Tests

Test 10 runs a wrap test on ports on the terminal adapter, the TMA card, the 3299 Models 2 and 3, and the 7232 dual control unit terminal multiplexer. Test 10 will not run on a 3299 Model 1. If a terminal is in use on one of the ports selected for a wrap test, this test will not interrupt the operation of that terminal. The wrap test will not be performed, and the test will indicate that the selected port is in use. This test cannot be run on the requesting terminal. The results of the port wrap test will be indicated by a text message on line 23. The menu displayed is shown in Figure 2-45. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /10
3. Press ENTER.

```

          _____ Port Wrap Test _____

Option      Description

1,n         Direct wrap for terminal adapter port n
2,n         3299/terminal multiplexer wrap for port n (n=0-31)

           To insure a valid wrap the cable must be
           disconnected from the wrapped port.

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

PF: 3=Quit          12=Test menu

```

Figure 2-45. Port Wrap – Test 10

When using Test 10, disconnect the signal cable from the port that is being wrapped. Reflections from the signal cable can cause the test to fail, giving a false error indication. If failures occur, see the 3174 *Subsystem Control Unit Status Codes*, GA27-3832, for recovery action.

Option 1 (Direct Wrap)

- For Models 1L through 13R, valid terminal adapter port numbers are 0, 8, 16, and 24.
- For Models 51R through 63R, valid terminal adapter port numbers are 0 through 8.
- For Models 81R through 92R, the valid port number is 0.

Option 2 (Multiplexer Wrap)

- For Models 1L through 13R, valid port numbers are 0 through 31.
- For Models 51R through 63R, valid port numbers are 0 through 15.
- For Models 81R through 92R, valid port numbers are 0 through 7.

Test 11: Trace Control

This test is to be used by service representatives. The service representative must obtain a password from an IBM support facility to perform this test.

Trace Control is an internal subsystem facility that is used to record specific subsystem processing information. The information that is traced is saved in machine storage and can be written to the Control diskette as required. Two types of information can be recorded by the trace facility:

- Data between processes
- Internal data flow.

Environment control block (ECB) traces record information between processes. When ECBs are traced, the appropriate ECB numbers are entered as part of the trace test request.

Function traces record information within a process. For example, internal data flow for the file adapter is recorded.

The trace facility is performed in two environments:

- Background
- Foreground.

Background trace is integrated into the controller microcode and is started as a part of the controller normal IML sequence. Background trace must be stopped before a foreground trace can be started.

Foreground trace is started by selecting a Test 11 option and specifying ECB(s) tracing or Internal Data Flow tracing. Test 11 provides a means of starting, stopping, or modifying a particular trace. When the trace facility is started, with a Start Trace command, a foreground trace starts. When the trace facility is stopped with a Stop Trace command, all traces are stopped. When a foreground trace is no longer required, the foreground trace must be stopped and the background trace must be restarted, either by use of the Test 11 trace facility or by a normal IML.

Trace Control Mode

There are four trace control modes. Mode 02 is the default mode if another mode is not selected when setting up a trace.

Mode 01 Do not write to the diskette or fixed disk and do not wrap the trace data area in controller storage.

Mode 02 Do not write to the diskette or fixed disk and wrap the trace data area in controller storage.

Mode 03 Write to diskette or fixed disk without suspend.

Mode 04 Write to diskette or fixed disk with suspend.

How to Use the Trace Facility

Before you attempt to start or stop a trace, the following information must be obtained from the 3174 support center:

- Check digit
- Trace mode (optional)
- Setup ECB number(s) or Setup Trace Function number(s).

Trace Facility Options

- 11,1,Check digit,n,n,n,n.....n Set Up ECB(s) Dispatched
- 11,2,Check digit,n,n,n,n.....n Set Up ECB(s) Returned
- 11,3,Check digit,n,n,n,n.....n Set Up DCB(s) Ports
- 11,4,Check digit,n,n,n,n.....n Set Up Trace Functions
- 11,5,Check digit,nn Set Up Trace Mode
- 11,6,Password Start Trace
- 11,7,Password Stop Trace

11,1 Option The specified ECBs are traced when dispatched. Format = 11,1,Check digit,n,n,n,n.....n where n,n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,2 Option The specified ECBs are traced when returned.
Format = 11,2,Check digit,n,n,n,n.....n where n,n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,3 Option The specified ports are traced.
Format = 11,3,Check digit,n,n,n,n.....n where n,n,n,n,n.....n are port numbers. The check digit number and the port number(s) are obtained from the 3174 support center.

11,4 Option The specified functions are traced.
Format = 11,4,Check digit,n,n,n,n.....n where n,n,n,n,n.....n are trace function numbers. The check digit number and the trace function number(s) are obtained from the 3174 support center.

11,5 Option The trace runs in the specified mode.
Format = 11,5,nn where nn are mode numbers 01 through 04. The check digit number and the mode number are obtained from the 3174 support center.

11,6 Option The trace is started.
Format = 11,6,password
The password is obtained from the 3174 support center.

11,7 Option The trace is stopped.
Format = 11,7,password
The password is obtained from the 3174 support center.

How to Start a Foreground Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press TEST to enter test mode.
2. Type in **11,7,Password** (Stop Trace)
3. Type in **11,5,check digit,nn** (Set Up Trace Mode) (This step is optional.)
4. Type in one of the following to set up the desired trace:
 - 11,1,check digit,n,n,n,n.....,n**
 - 11,2,check digit,n,n,n,n.....,n**
 - 11,3,check digit,n,n,n,n.....,n**
 - 11,4,check digit,n,n,n,n.....,n**
5. Type in **11,6,password** (Start Trace)
6. Type in **11,7,password** (Stop Trace)

Note: The password is obtained from the 3174 support center.

How to Start a Background Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press Test to enter test mode.
2. Type in **11,7,Password**
3. Type in **11,6,Password**

Note: The password is obtained from the 3174 support center.

Test 12: Asynchronous Emulation Adapter Tests

Test 12 provides a test facility for terminals, ports, and smart-modems attached to an Asynchronous Emulation Adapter (AEA). It also provides a status summary for all ports of the three Asynchronous Emulation Adapter hardware groups (HGs), and allows line errors to be reset for an individual Asynchronous Emulation Adapter port or for all ports of a specific Asynchronous Emulation Adapter HG. When Test 12 is selected, the menu shown in Figure 2-46 is displayed. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/12**
3. Press ENTER; the Asynchronous Emulation Adapter Test Menu is displayed.

_____ Asynchronous Emulation Adapter Tests _____	
Option	Description
1	AEA ports test menu
2	Display status summary
3	Reset line errors on all AEA HGs
3,n	Reset line errors on HG n (n=21-23)
4,m,n	Display error counters for port m on HG n (m=0-7, n=21-23)
5,m,n	Display connectivity for port m HG n (m=-7, n=21-23)
Note:	
- Option 1 exits from 3174 TEST mode	
To go directly to other tests, enter: /Test,option	
Select option; press ENTER ==> _	
PF: 3=Quit	12=Test menu

Figure 2-46. Test 12 Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter menu to display the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-47 on page 2-171 for an example of the test menu.

Option 2. Select option 2 on the Asynchronous Emulation Adapter menu to display the status summary for the ASCII terminals on all three ASCII HGs. See Figure 2-48 on page 2-174 for an example of the status summary panel.

Option 3. Select option 3 on the Asynchronous Emulation Adapter menu to reset the line errors on all the ASCII HGs installed.

Option 3,n. Select option 3 to reset the line errors for the specific HG n.

Option 4,m,n. Select option 4 to display error counters for a specific port.

Option 5,m,n. Select option 5 on the Asynchronous Emulation Adapter menu to display connectivity for a specific port.

Test 12, Option 1

This test option shows the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-47 on page 2-171 for an example of the test menu.

```

_____Asynchronous Emulation Adapter Port Tests_____

Option      Description

 1,PN,HG      Connect to smart-modem
 2,PN,HG      AEA port wrap
 3,PN,HG      Transmit data (default settings)
 3,PN,HG,WXYZZ Transmit data (override settings)

PN=Port Number (0-7)   HG=Hardware Group (21-23)
WXYZZ=Override port and station descriptor values

NOTES:
- Use MENU REQUEST key sequence to return to this menu
  when above options are selected
- Option 2 requires a wrap plug on requested port
- Use TEST REQUEST key sequence to return to 3174 TEST mode

Select option; press ENTER ==> _

PF: 3=Quit                      12=Disconnect

```

Figure 2-47. Asynchronous Emulation Adapter Port Tests Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter Port Tests Menu to access and test a smart-modem through its Asynchronous Emulation Adapter port, provided that port is not presently in session. Access and manipulation of the modem, using that modem's command syntax, enables the following:

- Modem Customizing and Test

This function provides access to internal diagnostic and customizing procedures built into certain smart-modems. There are two reasons why this function is important:

1. By running diagnostics internal to the modem, you will be able to isolate a problem in the asynchronous communication equipment on a specific port, provided proper operation of the Asynchronous Emulation Adapter port has already been verified.
2. By customizing the modem to certain specifications, you can ensure proper operation or verify whether or not the modem had been customized correctly for normal operation.

- Modem Dial-out Function

This function enables you to test the dial-out capability of the modem. By providing a number to the modem of a phone nearby or of an actual ASCII dial-in port, you can verify proper operation of the modem.

Option 2. Select option 2 on the Asynchronous Emulation Adapter Port Tests Menu to access an Asynchronous Emulation Adapter port not presently in session. This access allows you to perform a wrap test on the Asynchronous Emulation Adapter port.

Note: The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) must be installed on the port connector before invoking the wrap test.

If a modem cable is attached to the port being tested, by installing a wrap plug at the modem end of that cable you can also test the cable.

Option 3. Select option 3 on the Asynchronous Emulation Adapter Port Tests Menu to verify an ASCII terminal's ability to transmit and receive data correctly. From the invoking terminal, you can send data through the Asynchronous Emulation Adapter port connector to a terminal not presently in session. This test will verify the data path and the operation of the terminal receiving the data.

Example of Option 3,PN,HG Test:

1. At any ASCII terminal, terminate the customer application or session (if active) and return to the Connection Menu.
2. For most ASCII terminals, hold down Esc and press T to enter test mode. (For those terminals that do not accept Esc and T for test mode, see the *3174 Terminal User's Reference*, GA23-0332.)
3. At the 3174 Test Menu, select Option 12 (Asynchronous Emulation Adapter Tests).
4. At the Asynchronous Emulation Adapter Test Menu, select Option 1 (AEA Port Tests Menu).
5. At the AEA Port Tests Menu, type in **3,PN,HG** where:
 - PN = Port Number (0–7) of the device being tested
 - HG = Hardware Group (21, 22, or 23) of the device being tested.
6. Press carriage return.
7. The controller responds with a READY message.
8. Perform steps a and b **only** if the device being tested is attached to a switched port with a smart-modem. If the port is nonswitched, go to step 9.
 - a. Type in **ATD9,,XXX-XXXX** where:
 - ATD (uppercase characters) must be keyed in while holding the shift key.
 - 9 is the access code (optional), and ,, is two 2-second pauses.
 - XXX-XXXX is the phone number of the smart-modem attached to the device being tested.
 - b. Press carriage return. The controller responds with a CONNECT message.
9. Type in a test message or any string of characters.

The message or characters will not appear on your terminal.
10. Press carriage return. The data will appear on the device being tested.
11. A test message can then be entered at the device being tested and sent back to the invoking terminal by keying in the test message and pressing carriage return.
12. To return to the Asynchronous Emulation Adapter Tests menu, press ESC, hold down CTRL, and press H.

The override settings, indicated by 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.

Note: If you enter override settings, you may also need to change the parameters on the ASCII device(s) you are testing.

The following table shows the values for WXYZZ:

Table 2-24. WXYZZ Override Settings			
W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Mark	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Space	20 = DTR	
3 = 1200 bps	3 = Even	80 = XON/XOFF	
4 = 2400 bps	4 = Odd		
5 = 4800 bps	7 = None		
6 = 9600 bps			
7 = 19 200 bps			

Test 12, Option 2

Figure 2-48 shows the status of the Asynchronous Emulation Adapter(s) and all devices attached to it.

_____Status Summary_____																									
Port	HG 21			HG 22			HG 23																		
Address	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	
Attach	d	s	d	d	l	s	l																		
Status	1	1	1	0	1	x	0	-	(Disabled)																(Not present)
Station	v	v	v	p	h	?	h																		
Line	.	.	.	:	.	.	*																		
Host/term	3	A	3		3																				
LU	+		+																						

d = direct	l = on	v = video display	. = 0 errors
l = nonswitched	0 = off	p = printer	: = 1-50
s = switched	- = disabled	h = host	= 51-100
3 = 3270	x = unconfigured	? = unknown	* => 100
A= ASCII	+ = in session		

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

PF: 3=Quit 12=Test Menu

Figure 2-48. Test 12 Status Summary Panel

Port Address: Indicates the terminal port number (0–7) for HG 21, 22, and 23.

Attach: Indicates how the terminal is attached to the Asynchronous Emulation Adapter port.

- blank = No attachment type (port unconfigured)
- d = Direct attachment
- s = Switched attachment
- l = nonswitched attached

Status: Indicates the state of the terminal at the time the status summary was requested.

- Disabled = This Asynchronous Emulation Adapter is in the disabled state.
- Not present = This Asynchronous Emulation Adapter is not installed in the controller.
- 0 = The terminal on that specific port is powered off (no current connection).
- 1 = The terminal on that specific port is powered on (connection present).
- x = The port is not configured.
- = The terminal or specific port is in a disabled state (no connections possible, unusable).

Station: Indicates the type of terminal to which that specific port is connected.

- blank = No station type (port unconfigured)
- ? = Unknown station type (no station has connected yet)
- v = Video display station
- p = Printer station
- h = Host station

Line: Indicates the number of parity, framing, and overrun errors that have been recorded on that particular port.

. = 0 errors recorded.
 : = 1–50 errors recorded.
 | = 51–100 errors recorded.
 * = Over 100 errors recorded.

Host/term: Indicates the type of host with which the terminal is presently communicating.

When STATION type is “v” (video) or “p” (printer) and the Host/term line is:

blank = No current host connection (if STATUS = 0 or -).
 blank = On connection menu (if STATUS = 1).
 3 = Connection to 3270 host.
 A = Connection to ASCII host.

When STATION type is “h” (host) and the Host/term line is:

blank = No terminal is currently connected to this host port.
 (If STATUS = 1, the attached terminal is either on the connection menu or awaiting the next connection.)
 (If STATUS = 0, the attached terminal has either powered off or connected to another host destination.)
 3 = A 3270 terminal is connected to this host.
 A = An ASCII terminal is connected to this host.

LU: Indicates whether or not the SNA session is bound and active.

blank = Session is not bound.
 + = Session is bound (on at least one logical terminal).

Test 12, Option 4

Option 4 provides a facility to display the error counters for a particular Asynchronous Emulation Adapter port. The following panel is an example of a disabled adapter and a disabled port.

```
_____Error Counters for PN 02, HG 21_____
Adapter (HG) status:           Disabled
Port (PN) status:             Powered off due to error
Error counters-
Framing error:                12345
Overrun error:                54321
Parity error:                 11111
Loopback error:              12129
To go directly to other tests, enter: /Test,Option
Select test; press ENTER ==>_
PF: 3=Quit                    12=Test menu
```

Figure 2-49. AEA Error Counters Example: Disabled Adapter and Disabled Port

Test 12, Option 5

Option 5 provides a facility to display the connectivity for a particular Asynchronous Emulation Adapter port. The following panel is an example of an enabled adapter and a display/printer connected to an ASCII host.

```

_____Connectivity for PN 02, HG 21_____

Adapter (HG) status:      Enabled
Port (PN) status:       Powered on
Device type:             Video display

Line speed/Parity        1200 / Odd
Flow control/Stop bits   XON/XOFF(XON) / 1

Current connectivity-

    LT   LT Addr      HG_PN   Host/Station Name
    1    n/a          21_    ASCII HOST

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

PF: 3=Quit              12=Test menu

```

Figure 2-50. Connectivity: Enabled Adapter and Display/Printer with an ASCII Host

Regardless of the upstream response, the screen is cleared. If a link-level error occurs, the hardware will attempt retransmission of the alert. If the data has been lost because of an error above the link level (DACTPU), the information may be lost without any error indication to the operator.

If an attempt is made to request an operator-generated alert screen from an unauthorized display station, the operator unauthorized indicator is displayed in the operator information area.

If other than the basic characters have been entered from the keyboard, the try again (X ? +) indicator is displayed.

If a communication check is detected, the Input Inhibited and Communication Reminder symbols, followed by a 5xx number, are displayed.

Test D: Distributed Function Terminal Dump

You may request a dump of a distributed function terminal, such as a 3290, from a 3278 or similar display station. For example, after a 3290 has been downstream-loaded and a failing symptom is present, remove the diskette from diskette drive 1 or 2, and insert the 3174 dump diskette (P/N 73X3726). When the diskette is removed from the 3174, a status code of 38X may appear in the Status indicators. This is a normal indication and stops when the dump diskette has finished loading its control program into controller storage.

Perform the following steps to request a dump of a distributed function terminal.

1. Remove the diskette from drive 1 or 2 and insert the 3174 dump diskette.
2. At an attached terminal, press and hold ALT; press TEST.
3. Type in `/d,n` (n = The port number of the DFT). When the request is successfully received and the dump is initiated, a plus sign (+) will appear adjacent to the n:

`/d,n+`

While the dump is in progress, alternating codes 4671 and 4672 display in the Status indicators on the 3174. After approximately 10 minutes, the dump is completed and a 4675 is displayed in the 3174 Status indicators.

4. Remove the dump diskette.
5. Reinstall the previously removed diskette.
6. Exit test mode.

The terminal for which the dump was taken requires a power-on reset. This ensures a new downstream load of that terminal.

Note: Only one DFT dump is allowed at any given time. If a request is entered for a port that is powered off and does not have a DFT connected (this is a valid request), a DFT dump cannot take place. In approximately 20 seconds, a timer will abort the dump request and clear the DFT dump facility resource. During these 20 seconds, if another dump request is entered, a wrong number indicator appears in the indicator row.

If the DFT dump test request is rejected, one of the following may appear.

X-f appears if another DFT dump is already in progress.

/d,n- appears if a 3174 dump diskette is not available in one of the controller diskette drives.

X #? appears if the terminal that was selected to be dumped is not a distributed function terminal.

Online Tests Configuration B

Introduction

The online tests are in two sections. One set of Online Tests is for microcode that is Configuration Support A and S (see page 2-120). The other set is for microcode that is Configuration Support B. If you are not sure of your 3174 microcode release level, select online test 5, option 1 (/5,1). The release level will be displayed on the screen.

Configuration B online tests has three modes: 1TEST, 2TEST, and 3TEST. You determine which test mode you are in by the number preceding the word "TEST" in the operator information area of the screen (1TEST, 2TEST, or 3TEST) or by selecting the host ID when selecting a test option. 1TEST is for host IDs 1A through 1H, 2TEST is for host ID 2A, and 3TEST is for host ID 3A.

Not all tests and options are available on 2TEST and 3TEST. If you select a test or option that is not available the following error messages will be displayed.

```
4610 This function is not supported for this configuration
4626 This function is valid for 1TEST only
4626 This function is valid for 2TEST only
4626 This function is valid for 3TEST only
```

Online tests are selectable from any 3278, 3279, or similar display attached to the controller. These tests are *not* selectable from distributed function terminals, such as a 3290. This test facility can be used during normal subsystem operation and is available after entering test mode. Test mode is entered by pressing the ALT and TEST keys simultaneously on an attached display station keyboard. The following tests can be selected by entering one of the test formats shown below or from the 3174 Test Menu shown in Figure 2-51 on page 2-184.

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 2-186.

```
/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 2-187. The following types of error logs can be displayed:

```
/1,1          -   Response time log for requestors active host ID
/1,1,n        -   Response time log for host ID n (n = 1A—1H, 2A, 3A)
/1,2          -   All event log: Error statistics for the 3174
/1,3,n        -   Hardware group: Error statistics for a specific hardware group
/1,4,n        -   Error statistics for a specific terminal port
/1,4,n,m      -   Error statistics for a specific terminal port of a specific hardware group
/1,5,xxxx     -   Status code: Error statistics for a specific status code
/1,6,n        -   Logical terminal: Error statistics for a specific logical terminal
/1,6,n,m      -   Logical terminal n host ID m (n = 0—254, m = 1A—1H, 2A, 3A)
/1,7          -   Change log mode (Normal/Intensive)
/1,8          -   Event log summary
/1,9,n        -   Host ID (n = 1A—1H, 2A, 3A)
```

Online Tests Configuration B

Test 2 Display Configuration Panels: Provides both hardware and microcode configurations on the controller. For detailed information about Test 2, see page 2-193.

- /2,1 – Hardware configuration: The hardware configuration is displayed.
- /2,2 – Configuration questions: The panels presented during configure (except panel 118) are displayed.
- /2,3 – Device definition: Printer Authorization Matrix and/or Logical Terminal Assignment panels.
- /2,4 – Asynchronous Emulation Adapter configuration: The Asynchronous Emulation Adapter configuration is displayed.

Test 3 (3270 Device Status Summary): The status of all terminal adapter (HG 26) attached devices is displayed. For detailed information about Test 3, see “Test 3 Configuration B: 3270 Device Status Information” on page 2-195.

- /3,1 – Status Summary is displayed.
- /3,2,n – Error counters for port n (n=0-31) are displayed.
- /3,3,n – Connectivity for port n (n=0-31) is displayed.
- /3,4,n – LU Status Summary for host IDn (n=1A–1H, 2A, and 3A) is displayed.

Test 4 (Reset Logs and Cable Errors): Resets the event log, traces, cable errors, and the response time monitor log. For detailed information about Test 4, see page 2-201.

- /4,1,n – Resets the response time logs for host ID n
- /4,2 – Resets the event log, traces, and cable errors
- /4,3 – Resets the cable errors.

Test 5 (Display Vital Data): Provides the following 3174 information:

Model Number	Controller ID (serial number)
Microcode functional release level	Microcode maintenance release
Installed microcode patches	Installed RPQs
DSL information.	

For detailed information about Test 5, see page 2-202.

- /5,1 Display Controller Vital Data
- /5,2,n,m Display Port Vital Data

Test 6 (Display Control Blocks): The port control areas and host control data are displayed. Can also display all logical terminal extensions (if any). For detailed information about Test 6, see page 2-205.

- /6,1,n – Register page
- /6,2 – The port control area information for the requestor's port is displayed.
- /6,2,n,m – The port control area information for a specific port and hardware group is displayed.
- /6,3 – X.25/X.21 SHM Host Control Data
- /6,4,n,m – LT n Control Area on Host ID m (n=0–254, m=1A–1H, 2A, 3A)

Test 7 (Color Convergence): For more information, see page 2-217.

Test 8 (Extended Functions and Programmed Symbols): For more information see page 2-217.

Test 9 (Token-Ring Tests): Provides the ability to display the status of the Token-Ring network, the Token-Ring adapter status counters, and attached links. Test 9 also provides the ability to reset the Token-Ring network and attached link status counters. For detailed information about Test 9, see page 2-218.

- /9,1 – Monitor Token-Ring status.
- /9,2 – Display Token-Ring adapter status summary.
- /9,3 – Reset Token-Ring adapter status counters.
- /9,4 – Display link status summary for all links.
- /9,5,n – Display link status summary for link address n.
- /9,6 – Reset link status counters for all links.
- /9,7,n – Reset link status counters for link address n.
- /9,8 – Display gateway host status summary.

Test 10 (Port Wrap Tests): Provides a port wrap test for terminal adapter ports (00, 08, 16, 24), TMA ports 00–31, and 3299 Model 2 and 3 ports 00–31. For detailed information about Test 10, see “Test 10 Configuration B: Port Wrap Tests” on page 2-228.

- /10,1,n – Direct wrap for a specific terminal adapter port
- /10,2,n – 3299/TMA port wrap

Test 11 (Trace Control): Provides an internal trace capability. This function is available only to service personnel. See “Test 11 Configuration B: Trace Control” on page 2-229.

Test 12 (Asynchronous Emulation Adapter Tests): Provides access to a test for an Asynchronous Emulation Adapter Terminal, port, or smart-modem. It also provides a status summary and capability to reset error counters on any or all Asynchronous Emulation Adapters. For detailed information on Test 12, see page 2-232.

- /12,1 – AEA Port Tests Menu
- /12,2 – Display status summary
- /12,3 – Reset line errors on all AEA HGs
- /12,3,n – Reset line errors on HG n.
- /12,4,m,n – Display error counters for port m on HG n (m=0-7, n=21-23)
- /12,5,m,n – Display connectivity for port m HG n (m=0-7, n=21-23)

Test A (Alerts): Provides a facility for operator-generated alerts on SNA controllers.

- /A,n – Alerts to host n (n=1A–1H, 2A, 3A)

For detailed information about Test A, see page 2-239.

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 2-241.

- /D,n – DFT dump for port n.

3174 Test Menu Configuration B

To display the 3174 Test Menu, shown in Figure 2-51, perform the following steps at any 3278 or similar display.

1. Press and hold ALT. Press TEST.
2. Press PF12, or CLEAR, or PA2.

_____ 3174 Test Menu _____	
Test	Description
0	Terminal check
1	Display event logs and response time log
2	Display configuration panels
3	3270 device status information
4	Reset logs and cable errors
5	Display vital data
6	Display Control Areas
7	Color convergence
8	Extended functions and program symbols
9	Token-Ring tests
10	Port wrap tests
11	Trace control
12	Asynchronous emulation adapter tests
A,n	Alerts to host n (n=1A-1H, 2A, 3A)
D,n	Dump device on port n (n=0-31)

Select test; press ENTER ==>_

PF: 3=Quit

Figure 2-51. 3174 Test Menu

Online Test Format

The general format for all online tests is /t,s,n,m, where:

- t = test number
- s = option number for tests that have menus, such as test 1
- n,m = value(s) required by some test menus.

For example:

A test entry of /1,2 will display all log records.

A test entry of /1,3,2 will display the log records for HG02.

These tests can also be selected by entering the following:

Example 1

1. From any select line, enter /1
The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter 2
All log records are displayed.

Example 2

1. From any select line, enter /1
The Logs Menu is displayed.
2. From the select line of the Event Log Menu, enter 3,2
The log records for HG02 are displayed.

Test 0 Configuration B: Terminal Check

This test may be run from 1TEST, 2TEST, and 3TEST and it provides a facility to test the requesting terminal's basic functions (such as highlighting, nondisplay, and insertion), as well as feature functions (such as light pens, magnetic card readers, and scanners).

To request Test 0, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in the following:
 - /0 or /
 - Press ENTER.The test pattern shown in Figure 2-52 is displayed.

```
          ____Terminal Check____  
  
3174 Controller  
Hardware Group      nn  
Port Number        mm  
  
          ?SEL PEN          SEL PEN  
          &SEL PEN         >SEL PEN  
          NON DISPLAY      INSERT CK  
  
To go directly to other tests, enter: /Test,Option  
Select test; press ENTER =====> __  
  
PF:   3=Quit                12=Test menu
```

WHERE:

- nn = The adapter HG number of the terminal that requested the test.
- mm = The port number of the terminal that requested the test.
- NON = The nondisplay field that should not appear on the screen.

Figure 2-52. Test 0 Display Pattern

The following terminal functions are tested:

- High-intensity function
- Nondisplay function
- Selector pen (if one is attached)
- Various key functions and modes
- Four-color function and base-color switch capability on a 3279 or similar color display station
- Audible alarm (if one is attached).

Test 1 Configuration B: Display Logs Menu

Test 1 provides a response time log and event statistics for terminals, hardware groups, and ports. To select a specific event log from the Logs Menu, shown in Figure 2-53, perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /1
3. Press ENTER; the Logs Menu is displayed.
4. To display a specific event log, type in the option number of the desired log and press ENTER.

```

                _____ Logs Menu _____

Option      Description                (Current log mode: Normal )

 1,n        Response time log for host ID n (n=1A-1H, 2A, 3A)
 2          All events logged
 3,n        Hardware group (n=0-99)
 4,n,m      Port n, hardware group m (n=0-31,m=0-99)
 5,xxxx     Status code (replace x's with search digits)
 6,n,m      Logical terminal n host id m (n=0-254, m=1A-1H, 2A, 3A)
 7          Change log mode (normal/intensive)
 8          Event log summary (by category and hardware group)
 9,n        Host ID (n=1A-1H, 2A, 3A)

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

PF: 3=Quit                12=Test menu

```

Notes:

1. For Models 1R through 13R, valid terminal adapter port numbers are 0 to 31.
2. For Models 51R through 63R, valid terminal adapter port numbers are 0 to 15.
3. For Models 81R through 92R, valid terminal adapter port numbers are 0 to 7.

Figure 2-53. Test 1 Menu

Option 1. Type **1,n** to select option 1 from the Logs Menu. The resulting panel shows the response time monitor (RTM) log if the controller is configured for RTM.

Option 2 – 6. These options can only be run from 1TEST. Similar panels are displayed when options 2, 3, 4, 5, or 6 are selected from the Logs Menu. The difference in the format of the log record panels is the title line. Each panel contains the menu selection and the specified parameter value. If no event record exists for the requested event log, a No entries were found message is displayed. To select a log record from the Logs Menu, enter one of the following test requests:

- 2** All events logged. All the errors in the event log are displayed.
- 3,n** (n = a specific hardware group number from 0 to 99) All errors in the event log for the hardware group selected are displayed.
- 4,n,m** (n = a specific terminal port number from 0 to 31; m = a specific hardware group number from 0 to 99) all errors in the event log for the port number on the specific hardware group selected are displayed.

5,xxxx (the x's are replaced with a status code). Four characters must be entered. An x can be used as a "don't care" character. For example: On the select line on the Logs Menu panel, enter **5,x501**. The event log will be searched, and all the 501 status codes that occurred since the last time the logs were reset will be displayed.

6,n,m (n = a specific logical terminal number from 0 to 254, m = a specific host ID number from 1A to 1H, 2A, or 3A) all errors in the event log for the logical terminal number on the host ID that was selected are displayed.

Notes:

1. 1A to 1H identifies from one to eight hosts that can be configured for the Token-Ring Adapter on Models 3R, 13R, 53R, and 63R. This also applies to any model that can be alternately configured to simulate a Model 3R, 13R, 53R, and 63R. See the *3174 Planning Guide* for details.
2. 2A or 3A identifies a host link through a Concurrent Communication Adapter

Option 7. This test can only be run from 1TEST. Type **7** to change the log mode from **Normal** to **Intensive** and from Intensive back to Normal. The current log mode is noted on the Test 1 Menu screen. Normal is the mode regularly used for logging errors. Intensive was created to record those high-frequency loggable errors that are not recorded in Normal mode. Because of the high frequency of the errors, Intensive mode should only be used when needed. To guard against continued use, the controller will change the log mode back to Normal when a 76-hour timer expires.

Option 8. This test can only be run from 1TEST. Type an **8** to display the Event Log Summary. Option 8 provides a single panel of error log summary information available through the /1 test in 3174 online TEST MODE. All current log records, both internal and on diskette or fixed disk, are divided into the following event categories. A breakdown by Hardware Group (HG) is under each category. See Figure 2-54.

Option 9. Type **9,n** (n = 1A—1H, 2A, 3A) to display all events logged for a specific Host ID.

_____ Event Log Summary _____						
Category	Machine Check	Program Check	Comm Check	Media Check	Port Check	Other
Total	2	1	2	6	4	12
Subtotal by	HG	HG	HG	HG	HG	HG
	26 1	00 1	16 2	02 2	26 4	02 2
	00 1			99 3		26 10
				01 1		

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

PF: 3=Quit 12=Test menu

Figure 2-54. Event Log Summary (Example)

Log Records Example

Figure 2-55 illustrates the panel displayed if you select option 4 with a specific port number and hardware group.

```

_____ Log Records - All _____

(Day/Time since last POR: 000/08:11)
Day Time  SC   QA  PHG_PN  CHG_PN  ID  HA  Extended data bytes (B1-B16)
          B1  B3  B5  B7  B9  B11 B13 B15
000 08:11 0331 51  11                1A  9025 1100 01
000 00:05 0384 05  99                1B  0387 0385
000 00:03 0500 01  16                1C
000 00:02 0532 10  11
000 00:02 3174 01  00
015 21:48 0402 02  16  26_02  2A  002 0000 0003 F350 0000
015 21:22 0401 03  16  26_02  3A  006 0001 0004 3c40 4000
015 21:20 0209 51  26_08  16  2A  008
015 21:19 0201 51  26_08  16  2A  008
015 21:07 3174 01  00
015 20:01 0311 01  87                9051 0500
015 19:14 0807 20  22_04  26_00  1D  0000 0000 0000 0000 02

PHG_PN=Primary HG_PN  HG=Hardware Group SC=Status Code ID=Host ID
CHG_PN=Connection HG_PN PN=Port Number QA=Qualifier HA=Host Address

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

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

```

Figure 2-55. Log Record Display Panel

Day/Time

The Day/Time value indicates the setting of the 3174 interval timer when the request to display the log is entered. Since the interval timer is reset to zeros when the controller is powered off and on, it also indicates the elapsed time since the power-on occurred. This timer can be set to the actual time of day using an offline test. The day value range is 000 to 255 and is increased by 1 every 24 hours. The time field is specified as 00 hours through 23 and 00 minutes through 59.

The Day/Time represents the day and time with respect to power-on when the log event occurred.

SC Field

SC = The base status code that was logged. See the *IBM 3174 Status Codes, GA27-3832*, for the recovery action.

QA Field

QA = The qualifier associated with the base status code.

PHG and CHG Fields

PHG (Primary Hardware Group) and CHG (Connection Hardware Group) = The hardware group associated with the error that occurred. The PHG field contains 00 or 99 if the error is not associated with a particular hardware group, or if the hardware group cannot be identified. The values 00 and 99 are not displayed in the CHG field. An example of this would be a 3278 terminal attached to a TMA in a 3174 Model 1L. The

PHG would be HG26 and the CHG would be HG16. The hardware groups for all models of the 3174 are shown in Table 2-25.

Table 2-25. Hardware Group Numbers			
HG	Unit	HG	Unit
00	Invalid or unknown	23	Asynchronous Emulation Adapter
01	Diskette Drive 1/File Adapter	26	Terminal Adapter
02	Diskette Drive 2/File Adapter	26	Terminal Multiplexer Adapters
03	Fixed Disk 1/File Adapter	31	Token-Ring Adapter
04	Fixed Disk 2/File Adapter	46	Encrypt/Decrypt Adapter
08	Timer	51	Concurrent Communication Adapter
09	Operator Panel	52	Concurrent Communication Adapter
11	Communication Adapter	80	Test Monitor
16	Channel Adapter	81	Test All CSU Mode
16	Channel Driver/Receiver	82	Test All Installed Mode
21	Asynchronous Emulation Adapter	87	Processor/Storage
22	Asynchronous Emulation Adapter	99	Unassigned Hardware Group

PN Field

PN = The port number (PN) is used in conjunction with the PHG and CHG fields in the Log Records menu. This field is not displayed at the operator panel.

The Hardware Group 26 port numbers for the 3174 Models 1L through 13R range from 0 to 31. The Hardware Group 26 port numbers for 3174 Models 51R through 63R range from 0 to 15. The Hardware Group 26 port numbers for 3174 Models 81R through 92R range from 0 to 7.

ID Field

ID = The host address that was active when the status code was logged.

HA Field

HA = The Host Address, if the error is related to attached terminals. The HA field is not displayed at the operator panel. Certain terminals may use multiple logical terminals, such as a 3290.

Extended Data Fields (B1–B16)

The extended data fields contain supplementary information that may be useful to resolve a problem, such as TYPE and LOCA of the failing FRU, or the failing bytes in a data stream error. To determine the definition of the extended data (B1 – B16), see the *IBM 3174 Status Codes, GA27-3832*. The extended data field in the status code chart correlates to this field. See the following example on how to correlate a log entry to the *IBM 3174 Status Codes*:

Log Entry = 0504 0511 00 9253 22

- 0504 = Status code
- 0511 = Qualifier and hardware group
- 00 = PN (none associated with this log entry)
- 9253 = FRU Type number
- 22 = Location of the FRU

To find this status code in the status code chart, look for status code 0504 with a QA field of 05.

Status Code Entry = 0504 05HG B1B2 B3B4

- 0504 = Status code
- 05HG = Qualifier and hardware group
- B1B2 = FRU Type Number
- B3B4 = Location of the FRU

Note that the PN field is not shown in the status code chart.

Test 1, Option 1

If the 3174 has been configured for local display of the RTM log or the host has enabled this function, the /1,1 Test allows an operator to show the RTM log on authorized displays (except terminals such as the 3290).

Type 1,n (n=1A—1H, 2A, 3A) to select the Response Time Monitor (RTM) from the Logs Menu. An example of the Response Time Monitor log is shown in Figure 2-56.

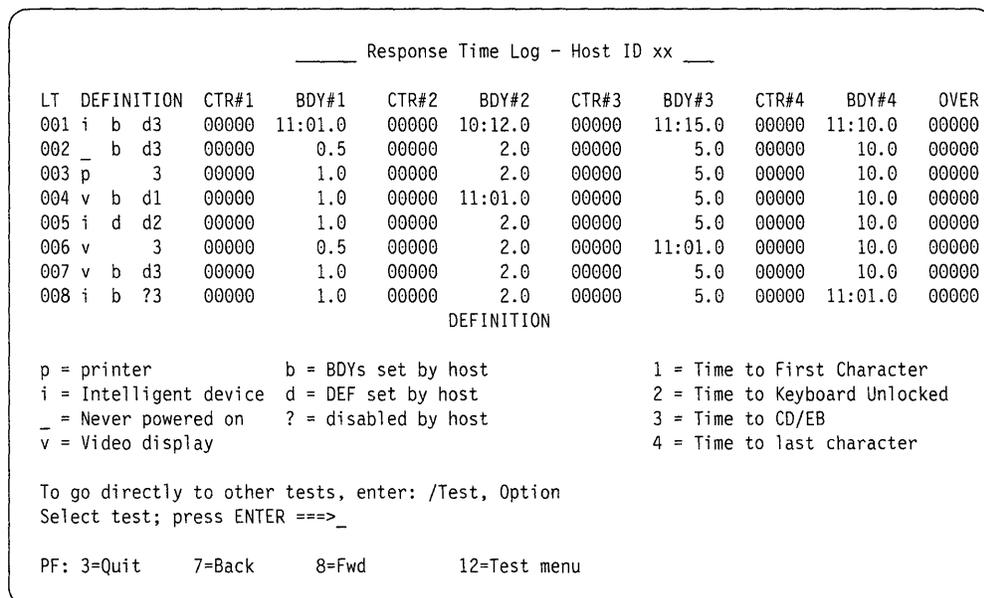


Figure 2-56. RTM Log Configuration Support B

The example shows representative information for the first eight logical terminals. If the 3174 is not customized for RTM, the display station keyboard is inhibited. Each time the PF8 key is pressed, the next group of eight terminals is displayed.

- CTR#1 = First-counter response time = 0 up to BDY#1 value
- CTR#2 = Second-counter response time greater than BDY#1 up to BDY#2 value
- CTR#3 = Third-counter response time greater than BDY#2 up to BDY#3 value
- CTR#4 = Fourth-counter response time greater than BDY#3 up to BDY#4 value
- BDY#1 = First boundary in minutes and seconds
- BDY#2 = Second boundary in minutes and seconds
- BDY#3 = Third boundary in minutes and seconds
- BDY#4 = Fourth boundary in minutes and seconds
- OV = Overflow (response time exceeding last boundary).

Note: The displayed boundaries are rounded to the nearest tenth of a second.

Reset the Response Time Monitor

The operator at an authorized display can reset the RTM logs of all configured devices. All log information is reset except the customized boundaries, the customized RTM definitions, and pending transaction status. In test mode, entering /4,1 resets the RTM log. When the reset is completed, a completion message appears on line 23.

If the 3174 is not customized for RTM, when /4,1 is entered, a message appears stating the function is not supported for this configuration. See "Test 4 Configuration B: Reset Logs and Cable Errors" on page 2-201.

Test 2, Option 1

The following panel is displayed.

Hardware Configuration Table									
HG	TYPE	LC	DESCRIPTION	SC	HG	TYPE	LC	DESCRIPTION	SC
00	9001	00	Invalid Card/Cond		09	9522	07	Ops Panel Assembly	
01	9111	01	Diskette 1 - 1.2MB	32XX	11	9025	03	Type 1 Com Adpt-XXX	
01	9025	03	File Adpt		21	933X	04	Asynch Emul Adpt	
03	9130	02	Fixed Disk - 20MB	32XX	87	9025	03	Storage 1MB	
08	9025	03	Timer		26	9025	03	Terminal Adpt	
09	9025	03	Ops Panel Adpt						

Select Test; press ENTER ==>>>_

PF: 3=Quit 12=Test Menu

Where:

HG	=	Hardware group
TYPE	=	FRU Type number
LC	=	FRU location
SC	=	Status code. This field contains a 32XX number only if a problem has occurred with a FRU during an IML.

Note: This table shows the configuration for Model 51R. Only those FRUs that are physically installed are displayed in this table.

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

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

Figure 2-58. Hardware Configuration Table

Test 3, Option 1

This test is only available from 1TEST. The following panel is displayed.

```

_____Status Summary - HG 26_____
Port      00 02 04 06 08 10 12 14 16 18 20 22 24 26 28 30
Address   01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31

Attach    m m m m m m m d          m m m m m m m m m m m m m m m m
Status    1 1 1 1 0 0 1 0 1 0 0 0 0 0 0 0 - - 1 0 1 1 1 0 1 0 0 1 0 0 1
Terminal  e c v v ? v v v p          e p p v v e v v v v v i i v v v
Cable     . . . . . : . .          | . . . | . . . . . . . . . .
Cable Max. . . . . * : . .          | . . : * . : . . . . . : : *

d = direct      - = off(error)      i = DFT device      . = 0 errors
m = multiplexor c = combined        e = Reserved       : = 1-5 errors
x = unconfigured p = printer        ? = unknown        | = 6-15 errors
1 = on          v = video display    * = > 15 errors
0 = off

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

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

Figure 2-60. Status Summary

Port Address: indicates the terminal port number.

- For Models 1L through 13R, ports 00–31 are displayed.
- For Models 51R through 62R, ports 00–15 are displayed.
- For Models 81R through 92R, ports 00–07 are displayed.

Attach:

- d = The terminal is attached directly to the terminal adapter.
- m = The terminal is attached through a 3299 Terminal Multiplexer.
- M = A terminal that is attached to this controller through a 7232 Dual Control Unit Terminal Multiplexer.
- x = A terminal that is configured only for another controller through a 7232 Dual Control Unit Terminal Multiplexer. That terminal will not communicate with this 3174.
- ? = When displayed on this line under port 00, a question mark (?) means one of the following:

- The controller has not communicated with a directly attached terminal.
- The controller has not communicated with any of the terminals connected to a 3299.

Status: Indicates one of the following conditions on the configured terminals at the time the test request was entered:

- 1 = The attached terminal is communicating with the 3174.
- 0 = The attached terminal is powered off or disconnected.
- = The terminal had been communicating with the 3174, but the terminal is now disabled from the controller because of errors. Run Test 1, Option 4 (Event Log) and check for any 2XX status codes logged against the port number that was disabled.
- s = The terminal is presently communicating with another controller through a 7232 Dual Control Unit Terminal Multiplexer, in other words, it is in the switched state.

Terminal: Indicates the type of device connected.

- ? = The device attached to this port has not been communicating with the 3174. The terminal on this port may not have been powered on.
To reset this condition at the terminal: set the Normal/Test switch to Test and back again, or perform a power-on reset.
- v, p, or i = The display or video (v), printer (p), or DFT device (i) for this port has a known history of communicating with the 3174.

Note: If a terminal or multiplexer cable is disconnected and then reconnected, a terminal power-on reset is required to allow the 3174 to recognize the change. The terminal counter is reset by an IML, by a power-on reset on the attached terminal, or by online test 4.

Cable: Terminal errors that are caused by cable media-related problems are counted by the cable counter for each port address. The cable counters accumulate the number of cable transmission errors occurring in the most recent 30-minute time period. Every 30 minutes the cable counters are reset to 0 and error counting starts again. When any cable counter passes the threshold of 16 errors, status code 201 51 is recorded in the event log. The event log can be viewed to determine the number of cable errors that have occurred over an extended period of time. This log is displayed by using online test /1. The cable counters are also reset by an IML and online test /4 options 2 and 3. Individual cable counters are reset when the attached terminal is powered on.

Cable Max: The Cable Max counters retain the peak value attained by the Cable Threshold counters over an extended period. They are not reset every 30 minutes, but only are reset by IML and online test /4 options 2 and 3.

Test 3, Option 2

This option can only be run from 1TEST. The 3270 Device Status Menu is displayed. The following panel is an example of the error counters for the port specified by the parameters.

```

          ____Error Counters for PN 02, HG 26____

Adapter (HG) status:      Disabled
Port (PN) status:       Powered off due to error
Error counters-

  Poll time out:        10
  Read time out:        10
  Poll parity:          10
  Read parity:          10
  Cable                 40
  Cable Max             75

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

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

Figure 2-61. Error Counters Example: Disabled Adapter and Disabled Port

Test 3, Option 3

This option can only be run from 1TEST. The following panels are examples of connectivity. The status of the device determines which panel is displayed.

```

          ____Connectivity for PN 11, HG 26____

Adapter (HG) status:      Enabled
Port (PN) status:       Powered on
Device Type               Video display (MLT)

Current connectivity-

  LT  Bound  Host  IDn    HG_PN  Host/Station Name
           Addr

  (No host connectivity configured)

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

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

Figure 2-62. Connectivity Example: Enabled Adapter and Host Unconfigured

```

_____Connectivity for PN 11, HG 26_____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device Type               Video display (MLT)

Current connectivity-

      LT  Bound  Host
      IDn  HG_PN  Host/Station Name
      1   Yes   111      1A1      11      RALVM11
      2   n/a   n/a      21_02   21_02   Dow Jones
Active 3   n/a   n/a      22_07   22_07   The Source
      4
      5   No    100     2A2     51      RALVM29

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

PF:  3=Quit                12=Test menu

```

Figure 2-63. Connectivity Example: Enabled Adapter and Live MLT Display

Test 3, Option 4

The following panel is an example of the LU Status Summary. The test you entered from (1TEST=1A—1H, 2TEST=2A, 3TEST=3A) will be reflected by the ID at the top of the panel.

```

_____ ID 2A LU Status Summary _____

Port   00 02 04 06 08 10 12 14 16 18 20 22 24 26 28 30
Address 01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31
Terminal v v v c ? v v c p v v v v v v v p p v v e e v v v v i i v v v
LU      + + +      + +      +      +      +

p = printer      i = DFT device      + = in session
v = video display e = Reserved
c = Combined    ? = unknown

Connection number: Outgoing call 999-555-1234

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

PF:  3=Quit                12=Test menu

```

Figure 2-64. Status Summary

LU: This line is present only for 3174s running SNA. It indicates whether the SNA session is bound and active. For MLT ports, the + is displayed if any SNA session is active.

Online Tests Configuration B

Connection Number: This number is for X.21 or X.25 lines. One of the following messages can follow the connection number:

Outgoing Call, followed by the number being called. For X.25, the outgoing call number (or host DTE address) can be up to 15 digits long. For X.21, the outgoing call number can be up to 32 characters long, as entered on the dial terminal.

Direct Call (X.21 only).

Incoming Call followed by an optional number. For X.25, the Incoming Call or Host DTE Address can be up to 15 digits long. For X.21, the Incoming Call will be displayed.

Note: See Figure 2-60 on page 2-196 for an explanation of other fields shown on the panel.

Test 5, Option 1

The following panel is displayed. This panel reflects the Vital Data for the host selected by the 1TEST (ID=1A–1H), 2TEST (ID=2A), or 3TEST (ID=3A).

```

          ___Controller Vital Data___

Help ## 914 555 5555 or 914 555 1212 after 5; IBM ## 914 555 1234

Model Number:      11R      Patches      Active
Controller ID:    1234567      RPQs
Microcode Release: B1.0
Maintenance Release: 89186    123456  112361  112371  8K125
IML Drive/Type:   01/41      112344  112362  012372  7L123
                                   112343  112368  112369  7L124
DSL Information:   112345  112373  112373  8K123
3290 01.02 0000000000      002222  012364  112374  8K123
3179 01.00 0000000000      112355  112365  112375  8K123
9999 01.00 0000000000      112356  002366  002376  8K123
9998 01.00 0000000000      012357  112367  112377  8K124

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

PF: 3=Quit                      12=Test menu

```

Figure 2-67. Controller Vital Data

Note: If more than 30 patches are installed on the Control disk, PF8 = FWD will be displayed on this panel.

Help ## – This number is assigned by the customer in response to question 99 during customizing.

Model Number – The model number of the controller.

Controller ID – This ID is assigned by the customer in response to question 108 during customizing.

Microcode Release – This is the release level of the Control diskette. This is the configuration support release and suffix level of the Control disk. B is configuration support, 1 is the release level, and 0 is the suffix.

Maintenance Release – This is the year and Julian date that the microcode was released. 89 is the year, and 186 is the day in the year.

Online Tests Configuration B

IML Drive/Type — This is the drive and the type of IML that was performed.

Drive Type

- 01 = Diskette drive 1
- 02 = Diskette drive 2
- 03 = Fixed disk drive 1
- 04 = Fixed disk drive 2.

IML Type

- 41 = Load production (default) operational microcode
- 42 = Load back level operational microcode
- 43 = Load trial operational microcode.

Patches — These are the patch ids that can be in effect for the current system configuration. Even though listed, a patch is only active if the configuration of the system allows the patch to function. A listed patch is not necessarily functional.

Active RPQs — These are the active RPQ ids that are in effect for the current system. Blank entries indicate no active RPQs.

DSL Information — This information describes one DFT device on each line. The terminal model type comes first, followed by the release level and suffix for the DFT microcode. The DFT RPQ is the last field. The syntax (the parentheses do not appear) is:

(Configuration level)(Release level)(Suffix level)(DFT RPQ)

Test 5, Option 2

The following panel is displayed.

```

_____Port Vital Data—PN 02, HG 26_____
Device Type:          3179
Model number:        G
Plant of manufacture: *
Serial number:       *
Release level:       *
Engineering change date: *
                        B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
Device characteristics (hexadecimal): 03 1F 80
* = data not supplied by device

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

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

Figure 2-68. Port Vital Data

Test 6 Configuration B: Display Control Blocks

Test 6 provides the following information. Option 2 Port Control Area contains common subsystem information pertaining to all terminals and devices, and the Host Control Data (Option 3) contains information on the host adapter. In addition, limited device feature information is provided. Options 2 and 3 represent the most current information about a specific device, and should be checked when it is necessary to determine specific device parameters, such as:

- Type and feature information for attached terminals.
- Is the display screen size correctly specified?
- Is a modified data tag (MDT) bit set?
- The type of keyboard for a specific terminal.

Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in **/6**
3. Press ENTER.

___Display Control Areas Menu___	
Option	Description
1,n	Register page n (n=0-3F)
2	Port control area (Requestor's Port)
2,n,m	Port n control area on HG m (n=0-31 m=21-23,26)
3	X.21 SHM / X.25 Host Control Data
4.n,m	Port Control Area for Host Address n on Host ID m (n=0-254 m=1A-1H, 2A, 3A)

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

PF: 3=Quit 12=Test menu

Figure 2-69. Test 6 Menu

Option 1,n. Register page (n = 0—3F)

Option 2. Select option 2 on the Display Control Blocks Menu to display the port control area for the requesting terminal.

Option 2,n,m. Select option 2,n,m to display the port control area for the terminal on port n of hardware group m.

An example of the Port Control Area panel is shown in Figure 2-70 on page 2-206. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-71 on page 2-207 for an example of an LT Control Area panel.

Online Tests Configuration B

Option 3. Select option 3 on the Display Control Blocks Menu to display the host control data on controllers that are configured for X.21 or X.25. Figure 2-72 on page 2-213 shows the host control data for X.21 short-hold mode. Figure 2-73 on page 2-215 shows the host control data for X.25.

Note: This option only shows the correct XIDs sent and received during an X.21 short-hold mode session. XIDs exchanged before an SHM session is established are not included in the host control data.

Option 4,n,m. Select option 4,n,m (n=0–254, m= 1A–1H, 2A, 3A) to display the Logical Terminal Control Area for a selected host address on a specific host ID.

Notes:

1. 1A to 1H identifies from one to eight hosts that can be configured for the Token-Ring Adapter on Models 3R, 13R, 53R, and 63R. This also applies to any model that can be alternately configured to simulate a Model 3R, 13R, 53R, and 63R. See the *3174 Planning Guide* for details.
2. 2A or 3A identifies a host link through a Concurrent Communication Adapter

An example of the Port Control Area panel is shown in Figure 2-70. Multiple panels, labeled LT Control Area, are then displayed for each session. Multiple Logical Terminals (MLTs) are distinguished by an LT number at the top of those panels. See Figure 2-71 on page 2-207 for an example of an LT Control Area panel.

Test 6, Option 2

The following panel will display information about your terminal.

Port Control Area - PN 17, HG 26								
Segment 00	0	2	4	6	8	A	C	E
00	1111	2222	3333	4444	1111	2222	3333	4444
10	0000	1234	1234	1234	1234	1234	1234	1234
20	1234	1234	1234	1234	1234	1234	1234	1234
30	1234	1234	1234	1234	1234	1234	1234	1234
40	1234	1234	1234	1234	1234	1234	1234	1234
50	1111	2222	3333	4444	1111	2222	3333	4444
60	0000	1234	1234	1234	1234	1234	1234	1234
70	1234	1234	1234	1234	1234	1234	1234	1234
80	1234	1234	1234	1234	1234	1234	1234	1234
90	1234	1234	1234	1234	1234	1234	1234	1234
A0	1234	1234	1234	1234	1234	1234	1234	1234
B0	1111	2222	3333	4444	1111	2222	3333	4444
C0	1234	1234	1234	1234	1234	1234	1234	1234
D0	1235	1234	1234	1234	1234	1234	1234	1234
E0	1234	1111	4444	3333	1111	2222	3333	2222
F0	1234	1234	1234	1234	1234	1234	1234	1234

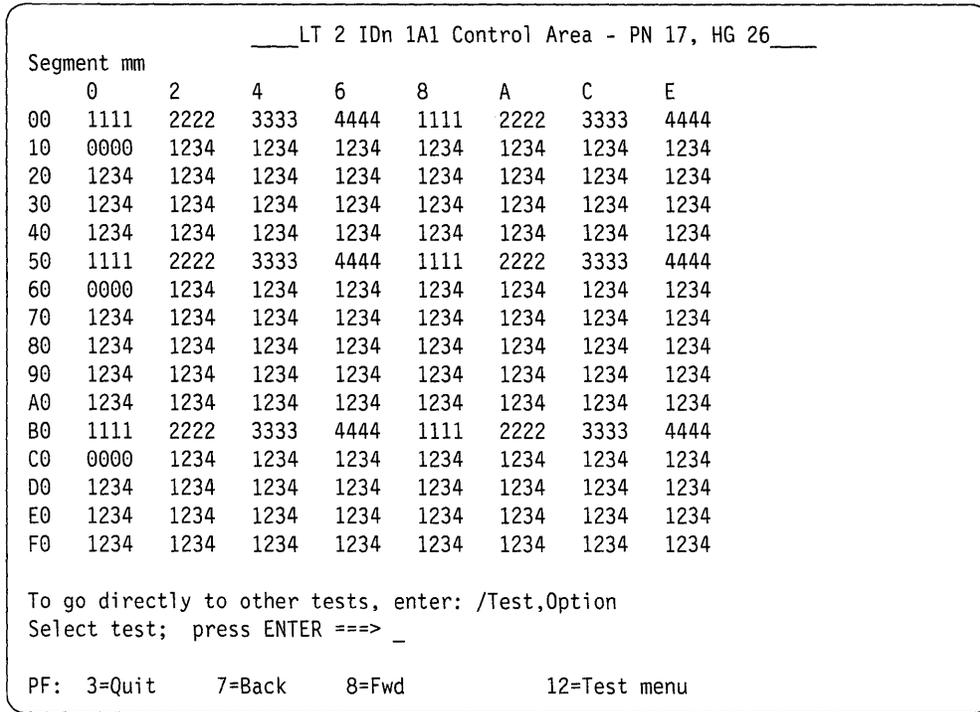
To go directly to other tests, enter: /Test,Option
Select test; press ENTER ==> _

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

Figure 2-70. Port Control Area Panel

Note: To analyze the information contained on this panel, see “Port Control Area Bit Definitions” on page 2-208.

Type **2,n,m** to select option 2,n,m. The following panel will display information for the logical terminal specified by the parameter values.



Where:

- n = blank, non-MLT device
- n = 1—5, logical terminal number of the MLT device for which the data on the panel applies
- mm = segment number of the current panel.

Note: To analyze the information contained on this panel, see "LT Control Area Bit Definitions" on page 2-148.

Figure 2-71. LT Control Area Panel

Port Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure.

Table 2-26 (Page 1 of 2). Port Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
Byte 04	0-1	Reserved	
	2	Op Complete pending from device	
	3	Selector Pen retry processing	
	4	Reserved	
	5-6	Reserved	
	7	Print ID entry mode	
	Byte 05	0-6	Reserved
7		Port timer enabled	
Byte 06	0	APL2 Character set supported	
	1	Reserved	
	2	Any ROS installed	
	3	Reserved	
	4	APL ROS installed	
	5-6	Number of PS Sets 00 = 0 01 = 2 10 = 4 11 = 6	
	7	Color device	
Byte 07 ¹	0	Printer	
	1	CUT display	
	2	DFT device	
	3	MLT device	
	4	Reserved	
	5	Reserved	
	6	Display HAP	
Byte 08	0	1 = 3278 mode 0 = Native mode	
	1	1 = Numeric lock 0 = No numeric lock	
	2	1 = Keyboard functions have been redefined 0 = No modifiable keyboard-Keyboard functions have not been redefined	
	3-7	Modifications keyboard ID Bit 2-0 Bit 2-1 00000 Reserved Reserved 00001 Typewriter A 00010 Data Entry 1 B 00011 APL C 0100 Reserved D through 11111	
	Byte 09 ¹ (Display)	0-3	0000 - Reserved 0001 - APL keyboard/numeric lock 0010 - Text keyboard/numeric lock 0011 - RPQ typewriter keyboard/numeric lock 0100 - Typewriter Attribute Select keyboard/numeric lock 0101 - APL keyboard 0110 - Text keyboard

¹Actual features identified to the 3174 by the terminal.

Table 2-26 (Page 1 of 2). Port Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
		0111 - APL Attribute Select keyboard 1000 - Data Entry 2 keyboard/numeric lock 1001 - Data Entry keyboard/numeric lock 1010 - Typewriter/numeric lock 1011 - Reserved 1100 - Data Entry 2 keyboard 1101 - Data Entry 1 keyboard 1110 - Typewriter 1111 - No keyboard	
	4-6	001 - Model 1 010 - Model 2 011 - Model 3 100 - Escape 101 - Reserved 110 - Model 5 111 - Model 4	
	7	0 - indicates display byte	
	Byte 09 ¹ (Printer)	0	ECS feature present
		1	APL feature present
		2	Reserved
		3	Reserved
	4-6		001 - Model 1 010 - Model 2 011 - Model 3 100 - Reserved 101 - Reserved 110 - Model 5 111 - Model 4
		7	1 - Indicates printer byte
		Byte 0A ¹ (Display)	0
1			Security key
2			Selector light pen
3			Reserved
4	Magnetic slot reader		
5	Reserved		
6	Extended function buffer		
7	ECS adapter		
Byte 0B ¹	0-2	Reserved	
	3	Color	
	4	Display HAP present	
	5-7	Reserved	
Byte 0F		Port Number 00-1F = TA ports 0-31 20-27 = AEA 1 ports 0-7 28-2F = AEA 2 ports 0-7 30-37 = AEA 3 ports 0-7	
Bytes 18-1B.		Device Type in EBCDIC (F0F0F0F0 if not known)	
Byte 1C		Additional Information (00 If not known) 0-3 = E = Programmable device	

¹Actual features identified to the 3174 by the terminal.

Table 2-26 (Page 2 of 2). Port Control Area Bit Definitions

Location	Bit	Meaning If Bit Is Turned On
		= 1 = Hardware or Microcode product
	4-7	= 1 = IBM Product = 9 = Non-IBM Product
Bytes 1D-1F		Model in EBCDIC (000000if not known)
Bytes 20-21		Plant of Manufacture in EBCDIC (0000 if not known)
Bytes 22-28		Serial number in EBCDIC (00000000000000 if not known)
Bytes 29-2B		Release level in EBCDIC (0000000 if not known)
Bytes 2C-3B		Addition level information (00.....00 if not known)
Byte 3C		2NN
Byte 3D		3NN
Byte 3E		4NN (Program Check Number)
Byte 3F		3NN
	0-2	Reserved
	3	Device powered on
	4-7	Reserved
Byte 50	0	Reserved
	1	VPD support
	2-6	Reserved
	7	0 = Converged keyboard present 1 = Enhanced keyboard present
Byte 5D	0-3	Reserved
	4	Monocase switch active in device
	5	Clicker enabled
	6	CECP Enabled
	7	Device CECP capable
Byte 75	1	Multiple display sessions on display
Byte 77	5	Shared Mode Printer
	6	Local Mode Printer
	6	System Mode Printer
Byte C8	0	ASCII connection for ASCII terminal or ASCII printer available
	1	ASCII host connection valid on this port
	2	AEA port configured as switched
	3-4	Reserved
	5	AEA line trace running

¹Actual features identified to the 3174 by the terminal.

LT Control Area Bit Definitions

Bits defined as "Reserved" may contain zeros or ones. They should be disregarded unless otherwise directed by the next level of the support structure. Bytes 04 and 06 indicate functions supported by the controller and reported as available by the device.

Table 2-27 (Page 1 of 3). LT Control Area Bit Definitions			
Location	Bit	Meaning If Bit Is Turned On	
Byte 04	0-2	Value Model Buffer Size	
		000 - Reserved	
		001 1 960 (480)	
		010 2 1920(1920)	
		011 3 2560 (1920)	
		100 - Reserved	
		101 - Reserved	
		110 5 3564 (1920)	
	111 4 3440 (1920)		
	3	0=Display 1=Non-Display	
	3-4	11	Printer
		01	Data Entry Display
		10	None of the others
	00	Typewriter Display	
4	0=Escape 1=Printer		
5	SOEMI printer present		
5-7	BREG printer present		
Byte 05	0	Katakana keyboard attached	
	1	SCS feature installed on printer	
	2	Text keyboard	
	3	3289 text feature	
	4	APL keyboard	
	5	Extended keyboard function	
	6	Printer supports extended LU1 data stream with SNA FM headers	
7	DFT session		
Byte 06	0	Not used	
	1	Security keylock present	
	2	Selector pen attached	
	3	Reserved	
	4	MSR/MHS attached	
	5	Reserved	
	6	3180 in model 6,7,8, or 9 mode	
7	ECS (APL/Text)		
Byte 07 ¹	0-2	Reserved	
	3	Color	
	4	Display HAP Supported	
	5-7	Reserved	
Byte 08	0	Reserved	
	1	LT connection active	
	2-5	Reserved	
	6	Numeric lock field	
	7	Reserved	
Byte 09	0	Protected field or attribute character	
	1-4	Reserved	
	5	Keyboard inhibited	
	6	Reserved	
	7	Insert mode	
Byte 0A	0	Reserved	

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-27 (Page 1 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	1	Test mode
	2	Alpha shift (not Katakana shift)
	3	Reserved
	4	Text indicator
	5	Upshift indicator
	6	Katakana shift
	7	APL indicator
Byte 0B	0	Online indicator
	1	System wait condition
	2	Hard lock condition
	3	Keyboard in use by operator
	4-7	Reserved
Byte 0D	0	Reserved
	1	Color override
	2	Reserved
	3	Host-initiated local copy request
	4	Alternate screen size
	5	Attributes not valid
	6	Reserved
7	X.21/X.25 Primary dial terminal	
Byte 0E	0-1	Reserved
	2	Print failure indicator
	3	Go elsewhere
	4	Minus function
	5	Wrong card
	6	Message pending
	7	Message reminder
Byte 0F	0	Printer printing - local copy
	1	If display has printer assigned for local copy
	2	Printer matrix changed (associated with this display)
	3-4	Reserved
	5	Communication Check Reminder
	6-7	Reserved
Byte 10	0	Invalid dead key
	1	2NN machine check
	2	Communication check
	3	Application Program check
	4	Security key off
	5	3NN machine check
	6	Too much data entered
	7	Operator not authorized
Byte 11	0	Not enough data entered
	1	Wrong number
	2	Numeric shift
	3	Operator retry

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-27 (Page 2 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	4	Device not functional
	5	Device busy doing local copy
	6	X.21/X.25 operator communication
	7	System lock (X-System)
Byte 12	0	Reserved
	1	My job indicator
	2	System operator indicator
	3	Unowned indicator
	4	Not enabled (not online)
	5	Reserved
	6	Reserved
	7	Minus symbol indicator (WT)
Byte 13	4	PU not active
Bytes 16-17		Cursor position (CUT display only) ²
Bytes 1A-1B		First character on display ²
Bytes 1C-1D		Last character on display ²
Byte 24	0	Model 5 wide screen
	1	Model 5 wide screen
	2	Reserved
	3	Reserved
	4	Inhibit display video
	5	Blank cursor
	6	Cursor reverse
	7	Cursor blink
Byte 25	3	APL mode
	4	APL attached
Byte 26		Row length
Byte 27		Indicator row length (if printer then PCIA length)
Byte 29		AID Code
Byte 33		Printer buffer size
		08 = 2K
		10 = 4K 20 = 8K
Byte 36	0	Printer allocated to local copy
	1	SNA - local copy printer allocated to host
	2	SNA - host request for local copy allocated printer
	3	Alternate row length
	4	Default row length indicator
	5	Reserved
	6	SNA - LU in ERP state
7	SNA - Host communication disabled (LU active)	
Byte 37	0	Local copy printing (host-initiated)

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-27 (Page 2 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
Byte 3E		4NN (Application Program check number)
Byte 3F		4NN (Communication check number)
Byte 4A	0	Reserved
	1	Selector pen for immediate defect field
	2	Request for select pen field
	3	Reserved
	4	Reserved
	5	Reserved
	6	Reserved
	7	Reserved
Byte 4B	0	Disable cursor display
	1	Reserved
	2	Second local copy requested
	3	Local copy busy
	4	Reserved
	5	Dead key sequence in progress
	6	Local copy received IR
	7	Reserved
Byte 4C	0	Device attached to CU VIA AEA adapter
Byte 52	0-7	Attribute affecting field cursor ³
Byte 53	0-7	Current extended field attribute
Bytes 54-55		Present attribute address ²
Bytes 56-57		Next attribute address ²
Byte 68	0	Printer equipment check/display disabled error
	1	Intervention required
	2	Printer busy processor abort
	3	Reserved
	4	Print in process
	5	Start printing pending
	6	Printer disabled
	7	Reserved
Byte 6A	0	Shift/numeric lock key still depressed
	1	Alpha key pressed
	2	Alternate shift key pressed
	3	Shift/numeric lock key in effect
	4	Left shift key
	5	Right shift key
	6	Katakana shift key was pressed
	7	APL key select APL mode
Byte 6B	0	Reserved
	1	Local copy being printed
	2	Reserved
	3	Reserved

¹Features supported and reported as available by the device associated with the LT Control Area.
²When using this byte, subtract hex 50. This will give you presentation space address origin 0.
³See 3174 Reference Summary, GX27-3872, for attribute description.

Table 2-27 (Page 3 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	4	Reserved
	5	Reserved
	6-7	Reserved
Byte 70		Local copy printer ID
Byte 71		Local copy printer address
Bytes 72-73		Printer DCB devices 0 - 15, ones in this field are authorized to use this printer
Bytes 74-75		Printer DCB devices 16 - 31 (same as Bytes 72, 73 description)
Bytes 76-77		Printer class assignments (printer only) 1 in one or more bits (0-15) represents printer class assignments 70-85
Byte A0		WCC save area
Byte AE	0	Reserved
	1	Device is bound
	2	Start data traffic (DFT - pending bind response)
	3	Outbound pacing ind (DFT - pending unbind response)
	4-6	Half-duplex FSM 000 = Send state 001 = Pending send 010 = Pending receive 101 = Contention 111 = Receive
	7	Error pending (response sent)
Byte AF	0-3	Bracket state mach 0000 = Between brackets 1111 = In brackets 0001 = Pending in brackets 0010 = Pending begin bracket 0011 = Pending between bracket-EC received 0100 = Pending between bracket-EC sent 0101 = Pending between bracket-response received 0110 = Pending between bracket-response sent 0111 = Pending between bracket-purge received 1000 = Pending between bracket-receive 1001 = Pending between bracket-purge sent
	4	0 = Send between chain 1 = Send in chain
<p>¹Features supported and reported as available by the device associated with the LT Control Area. ²When using this byte, subtract hex 50. This will give you presentation space address origin 0. ³See 3174 Reference Summary, GX27-3872, for attribute description.</p>		

Table 2-27 (Page 3 of 3). LT Control Area Bit Definitions		
Location	Bit	Meaning If Bit Is Turned On
	5-6	Chain receive 00 = Receive between chain 01 = Receive in chain 11 = Receive purging chain
	7	Crypto inbound padding indicate
Byte B0	5	End chain receive
	6	0 = Outbound segmenting between BIU 1 = Outbound segmenting in BIU
Byte B1	4	0 = Not last buffer in this RU 1 = Last buffer in this RU
	5	First buffer in RU
Byte B5	0-7	LU type bound (01,02,03)
Byte B6	0-7	Printer outbound pacing count
Bytes DC-DD		Default screen size
Bytes DE-DF		Alternate screen size
Byte F3	0	LT trace enabled
	2	DFT LTs are mapped
Byte F7	2	Greek E - Tech keyboard attached
<p>¹Features supported and reported as available by the device associated with the LT Control Area. ²When using this byte, subtract hex 50. This will give you presentation space address origin 0. ³See 3174 Reference Summary, GX27-3872, for attribute description.</p>		

Test 6, Option 3

Type **3** to select option 3 from the Display Control Blocks Menu. Figure 2-72 shows the information for X.21 short-hold mode.

```

_____X.21 /X.25 SHM Host Control Data_____

      0      2      4      6      8      A      C      E
00    0000  0000  0000  0000  0000  0000  0000  0000
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 2-72. X.21 Short-Hold Mode Host Control Data

Where:

uuuu = XID sent by the 3174 (comes from configured data)

xxxx = XID received by the 3174 on a reconnection

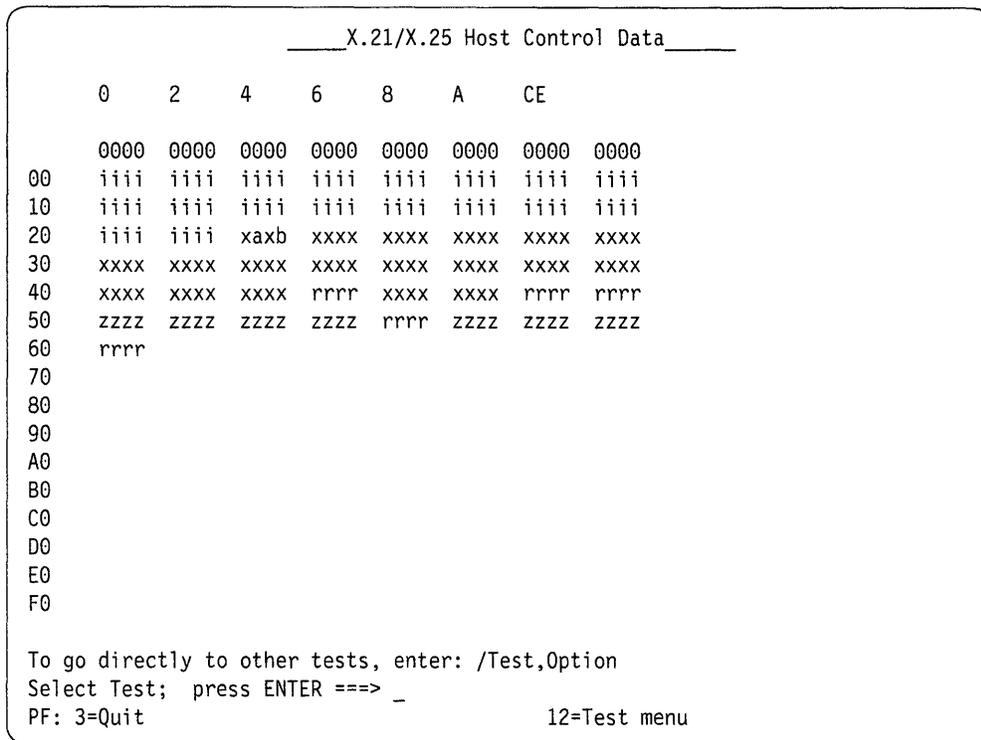
The configured XID (the one sent to the host at start time) and the last reconnect XID (the last one sent to the host during an SHM session) are displayed. If, for example, a normal X.21 host connection should be established following an SHM connection, the XID displayed by /6,3 would be for the last SHM connection. Bit 6 (SHSI) in the XID sent indicates short hold mode is active: it is not sent on with the initial XID; it is sent during a reconnection. This bit is turned on after an SNRM (Set Normal Response Mode) has been received. Table 2-28 on page 2-214 explains the information contained on the X.21 SHM Host Control Data panel shown in Figure 2-72.

Online Tests Configuration B

Table 2-28. X.21 XID Summary		
Location	Bit	Meaning
Byte 0 ¹	0-3	Format of XID I-field and PU type of Format of XID I-field. 0 = fixed format; bytes 0-5 used 1 = variable format; bytes 0-P are used
	4-7	PU type of the sender 1 = PU-T1 2 = PU-T2 3 = Reserved 4 = PU-T4 5 = PU-T5
Byte 1		Length in hexadecimal of the variable format XID I-field. This byte is reserved in a fixed format XID.
Bytes 2-7 ²		Node identification
Bytes 2-5	0-11	The product block number.
	12-31	The SDLC ID.
Bytes 6,7		Reserved
Byte 8		Link-station and connection protocol flags
	0-1	Reserved
	2	Link station role of XID sender 0 = Sender is a secondary link station 1 = Sender is a primary link station
	3	Reserved
	4-7	Link station transmit/receive capability 0 = two way alternating 1 = two way at the same time
Byte 9		Node characteristic of the XID sender
	0	PU capability to receive FMD requests 0 = PU cannot receive FMD requests from the SSCP 1 = PU can receive FMD requests from SSCP
	1	Reserved
	2-3	Segment assembly capability of the nodes PC element 00 = The mapping field is ignored and PUIs are forwarded unchanged 01 = Segments are assembled on a link station basis 10 = Segments are assembled on a session basis 11 = Only whole BIUs are allowed
¹ Byte 0 = 12 for 3174 variable format XIDs ² Bytes 2-7 = 017nnnnxxxx where: 017 = 3174 block number nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved ³ Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.		

Table 2-28. X.21 XID Summary		
Location	Bit	Meaning
	4-5	Reserved
	6 ³	Short hold status indicator (SHSI) 0 = Not already engaged in a SHM session 1 = Engaged in a SHM session
	7	Short hold indicator (SHI) 0 = Short-hold mode not supported 1 = Short-hold mode supported
Byte 10		Maximum I field length the XID sender receives
	0	Format flag (always 0)
	1-15	Maximum I (field length)
Byte 12	0-3	Reserved
	4-7	SCLC command/response profile 0 = SNA link profile (only value)
Byte 13	0-1	Reserved
	2	SDLC initialization mode options 0 = SIM and RIM not supported 1 = SIM and RIM supported
	3-7	Reserved
Byte 14-15		Reserved
Byte 16	0	Reserved
	1-7	Maximum number of I frames that can be received by the XID sender before an ACK is sent
Byte 17		Reserved
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 nnnnn = Answer to configuration question 215 (PUID), xxxx = Reserved ³ Bit 6 of byte 9 has no meaning if bit 7 of byte 9 is off.		

Type 3 to select option 3 from the Display Control Blocks Menu. The following panel shows the information for X.25.



Where:

- iiii = Reserved
- xxxx = 2-byte link counter
- xaxb = 2-byte link counter used in the example below
- zzzz = 2-byte circuit counter
- rrrr = Reserved

Figure 2-73. X.25 Host Control Data

Use the following example to determine how to locate a particular byte and the information following the example for descriptions of the link and circuit counters. The bytes are described in Table 2-28 on page 2-214, "Link Counters" on page 2-216, and "Circuit Counters" on page 2-216.

Example

To locate bytes 24 and 25:

1. Use the high-order digit 2. Scan down the column of numbers in the left margin of the panel. Find address 20.
2. Use the low-order digit 4. Scan left to right in the row of data next to address 20. Find the data under column number 4. Byte 24 contains xa; byte 25 contains xb.

Link Counters

- Bytes 24, 25 = The number of Information (I) frames sent by the 3174.
- Bytes 26, 27 = The number of Information (I) frames received by the 3174.
- Bytes 28, 29 = The number of Receiver Ready (RR) frames sent by the 3174.
- Bytes 2A, 2B = The number of Receiver Ready (RR) frames received by the 3174.
- Bytes 2C, 2D = The number of Receiver Not Ready (RNR) frames sent by the 3174.
- Bytes 2E, 2F = The number of Receiver Not Ready (RNR) frames received by the 3174.
- Bytes 30, 31 = The number of Reject frames sent by the 3174.
- Bytes 32, 33 = The number of Reject frames received by the 3174.
- Bytes 34, 35 = The number of I-frames that were retransmitted by the 3174.
- Bytes 36, 37 = The number of I-frames that were received by the 3174 with Frame Check Sequence (FCS) errors.
- Bytes 38, 39 = The number of receive errors detected by the 3174.
- Bytes 3A, 3B = The number of cycle steal underruns detected by 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 = A valid frame has not been received within the time limit specified during configuration.
- Bytes 48, 49 = The number of call attempts counted by the 3174.

Circuit Counters

- Bytes 50, 51 = The number of Data packets sent by the 3174.
- Bytes 52, 53 = The number of Data packets received by the 3174.
- Bytes 54, 55 = The number of Receiver Ready packets sent by the 3174.
- Bytes 56, 57 = The number of Receiver Ready packets received by the 3174.
- Bytes 5A, 5B = The number of Receiver Not Ready packets sent by the 3174.
- Bytes 5C, 5D = The number of Interrupt packets sent by the 3174.
- Bytes 5E, 5F = The number of Interrupt packets received by the 3174.

Test 7 Configuration B: Color Convergence

This test is only available on 1TEST. Test 7 performs color convergence on 3279 color display stations. For a description of this procedure, see the appropriate display station problem determination manual.

Note: No PF keys are provided for this test to return to the Test Menu. To bring up the Test Menu after performing the test, press the CLEAR key.

Test 8 Configuration B: Extended Functions and Programmed Symbols

Test 8 checks the programmed symbols (PS) and color for any device that uses PS or color. For a description of this procedure, see the appropriate display station problem determination manual.

see the original values.) See Figure 2-78 on page 2-226 for an example of the Gateway Host Status Summary panel.

Note: Option 8 is only available on those controllers with the Gateway feature. The feature is available on Models 1L, 1R, 2R, 11R, 11L, 12R, 51R, 61R, and 62R.

Test 9, Option 1

The following panel is displayed.

```

_____ Token-Ring Status _____

4697 - Local Token-Ring Adapter closed

4691 - Signal Loss (Adapter not detecting ring signal)

4692 - Hard Error (Adapter detecting a beacon condition)
       either internally or receiving a Beacon MAC frame)

4693 - Wire Fault (Adapter has detected a wire fault
       and de-inserts)

4694 - The test has been active for 00000 minutes.

4695 - The test will terminate in n minute(s)
       Press PF9 to continue for another 10 minutes.

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

PF: 3=Quit           9=Cont           12=Test menu

```

Figure 2-75. Token-Ring Status (Example showing messages that could occur)

4697 - Indicates that the Token-Ring adapter is closed.

4691 - Appears when the Token-Ring adapter detects a signal loss condition on the ring.

4692 - Appears when the Token-Ring adapter detects a beaconing condition.

4693 - Appears when the Token-Ring adapter detects a wire fault (open or short) condition on its own lobe.

4694 - Indicates the amount of time that has elapsed from the start of the ring status test.

4695 - Appears when the test has been running for 10 minutes. The test runs for another 5 minutes and terminates automatically, unless PF9 is pressed. If PF9 is pressed within the 5-minute time frame, the test runs 10 or more minutes and 4695 is displayed again.

4698 - Appears when the Token-Ring adapter is open.

Test 9, Option 2

The following panel is displayed.

```

_____Token-Ring Adapter Status Summary_____

Adapter Address - XXXXXXXXXXXXXXXX Adapter Status - Open
Customized Links - XXX Active Links - XXX

                Counters      Overflow

Line Errors      XXXXXXXX      0
Internal Errors  XXXXXXXX      0
Burst Errors     XXXXXXXX      0
ARI/FCI Errors   XXXXXXXX      0
Abort Delimiters XXXXXXXX      0
Lost Frames      XXXXXXXX      0
Receive Congestion XXXXXXXX      0
Frame Copied Errors XXXXXXXX      0
Frequency Errors XXXXXXXX      0
Token Errors     XXXXXXXX      0

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

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

Figure 2-76. Token-Ring Adapter Status Summary

- **Adapter Address** - This is the 6-byte Token-Ring address of the Token-Ring adapter set up when the controller was configured, followed by a 1-byte service access point address (SAP).
- **Adapter Status** - This shows the Token-Ring adapter's physical state relative to the Token-Ring (opened or closed).
- **Customized Links** - The number of links identified during configuration of the Control diskette. The number of configured links and host address range may reflect downgraded values differing from original configuration. (Run /2,2 to see the original values.)
- **Active Links** - The number of the links active at the time the test request was entered.

Line errors - This counter is increased when a frame is copied or repeated by the protocol handler, the error detect indicator is zero, and one of the following conditions exists:

- A code violation exists between the starting delimiter and the ending delimiter of a frame.
- A code violation in a free token.
- A frame check sequence error is a format type 1 frame.

Internal errors - This counter is increased when the controller recognizes an internal Token-Ring adapter error. These errors indicate the Token-Ring adapter is in a marginal operating condition.

Burst errors - This counter shows the number of burst interrupts from the protocol handler. The burst error counter indicates the number of frames that are in error due to noise on the ring.

Address Recognized Indicator/Frame Copied Indicator (ARI/FCI) - This counter is increased when the Token-Ring adapter receives a frame back that has the address recognized and/or the frame copied bit not set. This error is due to the receiving station having no buffers available, or a wrong address received (line hit), or the ARI/FCI bits could not be set.

Abort Delimiters - This counter is increased when the Token-Ring adapter transmits an abort delimiter. This occurs with internal Token-Ring adapter errors.

Lost Frames - This counter is increased when the Token-Ring adapter is in transmit mode and fails to receive the frame it transmitted.

Receive Congestion - This counter is increased when the Token-Ring adapter is busy and recognizes a frame addressed to it, but cannot receive the frame because of insufficient buffer space.

Frame Copied Errors - This counter is incremented when the Token-Ring adapter sees a frame with its own address and the ARI or FCI bit is set on. This indicates that another device or controller may be attached to the ring that has a duplicate address.

Frequency Errors - This counter is increased when the Token-Ring adapter detects an excessive difference between the ring data frequency and the Token-Ring adapter's frequency oscillator.

Token Errors - This counter is increased when the active monitor function detects an error with the token protocol. These errors indicate another device or controller is not following normal token protocols.

Test 9, Option 4

The following panel is displayed.

```

_____ Link Status Summary _____

Link Address      XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX
Primary/Secondary   XX/XX           XX/XX           XX/XX
Trans I-Frames     XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Rec I-Frames       XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Transmit Errors    XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Received Errors    XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
T1 Expired         XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Com/Res Ind        XX YY           XX YY           XX YY

Link Address      XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX

Primary/Secondary   XX/XX           XX/XX           XX/XX
Trans I-Frames     XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Rec I-Frames       XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Transmit Errors    XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Received Errors    XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
T1 Expired         XXXXXXXX - 0    XXXXXXXX - 0    XXXXXXXX - 0
Com/Res Ind        XX YY           XX YY           XX YY

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

PF: 3=Quit      7=Back      8=FWD      12=Test menu
    
```

Figure 2-77. Link Status Summary

The link status summary screen shows the link address, the data link control (DLC) primary and secondary states, the command/response indicator, and the logical link station counters.

Link Address - This is the station address assigned to each link during configuration. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Trans I-Frames - This counter shows the number of Information format LPDUs that have been sent, including all retransmissions. The actual counter for the link is reset when there is an overflow of any counter, or whenever the link is initialized.

Rec I-Frames - This counter shows the number of Information format LPDUs that have been received, including any that may have been out of sequence, but were otherwise valid.

Transmit Errors - This counter shows the number of times a link station detects an error condition that requires a retransmission of an I frame.

Receive Errors - This counter shows the number of Information frames received in error. This does not include the frames received with an invalid frame check sequence.

T1 Expired - This counter shows the number of times the T1 or reply timer expired. This timer is used to detect the failure to receive a required acknowledgment from a remote link station.

Com/Res Ind - XX indicates the last command/response received. ZZ indicates the last command/response sent.

Primary/Secondary - These are the SDLC primary and secondary states for the link station,

Where:

Primary State	Secondary State
80 Link Closed	80 Checkpointing
40 Disconnected	40 Local busy (operator)
20 Disconnecting	40 Local Busy (buffer)
10 Link Opening	10 Remote Busy
08 Resetting	08 Rejection
04 Frame Reject Sent	04 Clearing Algorithm Running
02 Frame Reject Received	02 Dynamic Window
01 Link Opened	01 Reserved

Note: The primary states are mutually exclusive. The secondary states are not mutually exclusive.

Primary States

The following paragraphs describe the Token-Ring adapter link primary states.

Link Closed

The link closed state is entered in the following cases:

- A DM response to a SABME or DISC has been queued for transmission. The Close command that caused the transmission will complete when the transmission completes.
- A DM or UA response to a DISC has been received. The Close command that caused the DISC transmission completes when the transmission completes.
- A Reset command has been received, but a transmission has already been queued to the hardware, or an ARB request or SSB response has been queued to the controller and must complete before the link station control block can be released.

No commands are accepted while the Token-Ring adapter is in the link closed state. All received frames are ignored.

Disconnected

The disconnected state is entered in the following cases:

- Acceptance of an Open Station SRB
- Acceptance of a SABME for a previously nonexistent station
- Receipt of a DISC command or a DM response from the paired station
- When the retry count has been exhausted due to time-outs.

In the disconnected state, all received frames are ignored except commands with the poll bit set, for which a DM is transmitted, and SABME, which is reported to the controller.

The following SRBs are accepted:

- Close station SRB - Transition to link closed.
- Connect station SRB - Transition to link opening.

Online Tests Configuration B

Disconnecting

The disconnecting state is normally entered on receipt of a Close station SRB when the initial return of the SRB is with an in-process return code (FF). This state may also be entered on expiration of the retry count in FRMR received. This state is maintained until one of the following occurs:

- Either a UA or DM response is received to the transmitted DISC command.
- A SABME command is received and a DM response has been transmitted.
- The retry count expires.

There are two ways to exit the disconnecting state, depending on how the disconnecting state was entered. If the disconnecting state was entered because of expiration of the retry count in FRMR received, exit from the disconnecting is to disconnected. If the disconnecting state was entered for some other reason (this is the normal case), exit from disconnecting is to closed or non-existent. The Token-Ring adapter exits this state to the link is nonexistent or the link is closed. Since the Close station SRB remains in-process while the link is in the disconnecting state, no other SRBs are accepted. All received frames other than SABME, DISC, UA, or DM are ignored.

Link Opening

The Token-Ring adapter enters the link opening state when the controller accepts a Connect station SRB.

Resetting

The resetting state is entered when a SABME command is received from a remote station and the link is open and not in the disconnected or link closed state. The Token-Ring adapter reports receipt of the SABME command to the controller using a DLC Status ARB indicating a SABME command was received and the Station ID of the affected station. In this state, the Token-Ring adapter accepts the following SRBs:

Close Station SRB - Transition to the disconnecting state.
Connect Station SRB - Transition to the link opening state.

All incoming frames are ignored except the following:

DISC - Transmit UA, transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to FRMR received.
SABME - The Token-Ring adapter informs the controller.

Frame Reject Sent

When the Token-Ring adapter transmits a Frame Reject (FRMR) because of the receipt of an illegal frame, it informs the controller with a DLC Status ARB containing the FRMR reason code. The adapter then enters the FRMR sent state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

All incoming frames except the following are ignored except that FRMR response final will be transmitted in response to command polls:

SABME - Transition to the resetting state.
DISC - Transition to the disconnected state.
DM - Transition to the disconnected state.
FRMR - Transition to the FRMR received state.

Frame Reject Received

When the Token-Ring adapter receives a Frame Reject (FRMR) from a remote station, the adapter informs the controller with a DLC status SRB containing the FRMR reason code. The Token-Ring adapter then enters the FRMR received state.

In this state, the Token-Ring adapter accepts the following SRBs:

Close station SRB - Transition to the disconnecting state.
Connect station SRB - Transition to the link opening state.

In this state, all frames except the following are ignored:

SABME - Transition to the resetting state
DISC - Transition to the disconnected state
DM - Transition to the disconnected state.

Link Opened

The link opened state is entered from link opening after the SABME-UA exchange which completes the connection protocol. This is the only state in which information transfer is allowed and in which transmit SRBs are accepted. In this state, the Token-Ring adapter handles sequential delivery and acknowledgment of information frames and retransmission if required.

If the primary state is changed from link opened because of receipt of a frame such as SABME or FRMR, or because the retry count has been exhausted, any outstanding Transmit requests are returned to the controller by using a single Transmit SSB. If the primary state is changed because of a user command such as Close station, outstanding Transmit requests are not returned.

Secondary States

The following paragraphs describe the Token-Ring adapter link secondary states.

Checkpointing

A poll is outstanding. I-frame transmission is suspended.

Local Busy (User)

A flow control SRB with a Set Local Busy option has been accepted. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (user set) option.

Local Busy (buffer)

An out-of-buffers return code has been set by the controller in response to a Receive Data ARB. I-frame reception is suspended pending a flow control SRB with a Reset Local Busy (buffer set) option.

Remote Busy

An RNR frame has been received from a remote station. I-frame transmission is suspended pending receipt of a Receiver Ready or Reject response, or a SABME command, or a response final I-frame.

Rejection

An out of sequence I-frame has been received and a REJ transmitted. I-frame reception is suspended pending receipt of an in-sequence I-frame or a SABME.

Clearing

A poll is outstanding and a confirmation of clearing Local Busy is required after the response is received.

Dynamic Window

A remote station on another ring is connected through a bridge to the local ring and there appears to be congestion through the bridge(s).

Test 9, Option 8

The following panel is displayed.

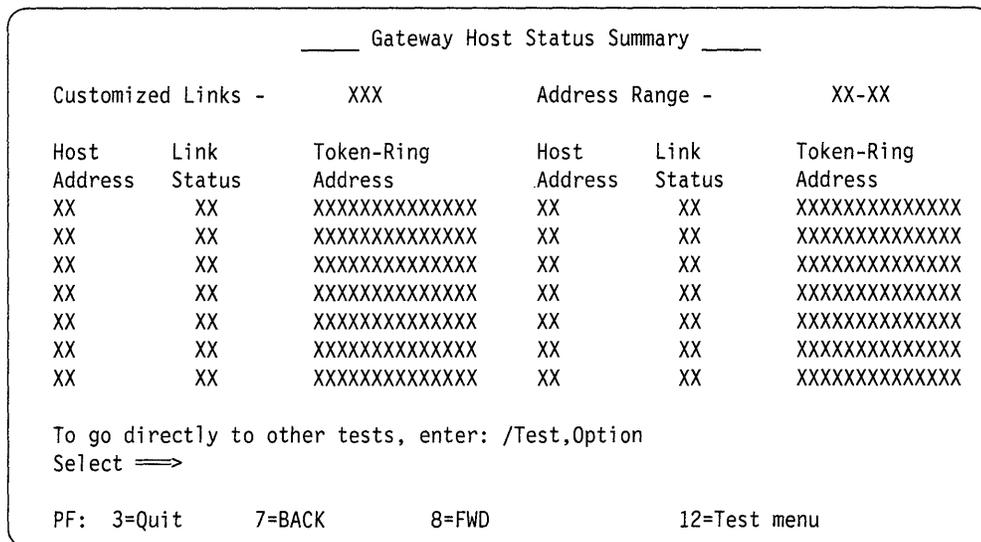


Figure 2-78. Gateway Host Status Summary

The Gateway Host Status Summary panel shows information on the links and addresses, and the status of the links.

Customized Links - The number of links declared at customizing time if storage was available to support them or the maximum number of links possible in the storage available (this field reflects the downgraded configuration). This field reflects one link for the local PU.

Address Range - The host address range declared in customizing. This field reflects the downgraded condition.

Host Address - The address assigned each link during customizing

Link Status - The 2-digit status code representing the status of the link:

For Model 1L and 11L:

- 00 = The Token-Ring attached physical unit is in disconnect mode
- 02 = The Token-Ring attached physical unit is connected.

For Models 1R, 2R, 11R, 12R 51R, 52R, 61R, and 62R:

- 00 = SNRM required
- 01 = SNRM received
- 02 = Connected/active
- 03 = Poll timeout.

Token-Ring Address - The station address assigned to each link during customizing. This address is the 6-byte Token-Ring adapter address followed by the 1-byte service access point (SAP) address.

Test 10 Configuration B: Port Wrap Tests

This test is only available on 1TEST. Test 10 runs a wrap test on ports on the terminal adapter, the TMA card, the 3299 Models 2 and 3, and the 7232 dual control unit terminal multiplexer. Test 10 will not run on a 3299 Model 1. If a terminal is in use on one of the ports selected for a wrap test, this test will not interrupt the operation of that terminal. The wrap test will not be performed, and the test will indicate that the selected port is in use. This test cannot be run on the requesting terminal. The results of the port wrap test will be indicated by a text message on line 23. The menu displayed is shown in Figure 2-79. Perform the following procedure at any 3278 or similar display station:

1. Press and hold ALT; press TEST.
2. Type in /10
3. Press ENTER.

___Port Wrap Test___	
Option	Description
1,n	Direct wrap for terminal adapter port n
2,n	3299/terminal multiplexer wrap for port n (n=0-31)
	To insure a valid wrap the cable must be disconnected from the wrapped port.
To go directly to other tests, enter: /Test,Option	
Select Option; press ENTER ==> _	
PF: 3=Quit	12=Test menu

Figure 2-79. Port Wrap – Test 10

When using Test 10, disconnect the signal cable from the port that is being wrapped. Reflections from the signal cable can cause the test to fail, giving a false error indication. If failures occur, see the *3174 IBM 3174 Status Codes*, GA27-3832, for recovery action.

Option 1 (Direct Wrap)

- For Models 1L through 13R, valid terminal adapter port numbers are 0, 8, 16, and 24.
- For Models 51R through 63R, valid terminal adapter port numbers are 0 through 8.
- For Models 81R through 92R, the valid port number is 0.

Option 2 (Multiplexer Wrap)

- For Models 1L through 13R, valid port numbers are 0 through 31.
- For Models 51R through 6R, valid port numbers are 0 through 15.
- For Models 81R through 92R, valid port numbers are 0 through 7.

Test 11 Configuration B: Trace Control

This test is to be used by service representatives. The service representative must obtain a password from an IBM support facility to perform this test.

Trace Control is an internal subsystem facility that is used to record specific subsystem processing information. The information that is traced is saved in machine storage and can be written to the Control diskette as required. Two types of information can be recorded by the trace facility:

- Data between processes
- Internal data flow.

Environment control block (ECB) traces record information between processes. When ECBs are traced, the appropriate ECB numbers are entered as part of the trace test request.

Function traces record information within a process. For example, internal data flow for the file adapter is recorded.

The trace facility is performed in two environments:

- Background
- Foreground.

Background trace is integrated into the controller microcode and is started as a part of the controller normal IML sequence. Background trace must be stopped before a foreground trace can be started.

Foreground trace is started by selecting a Test 11 option and specifying ECB(s) tracing or Internal Data Flow tracing. Test 11 provides a means of starting, stopping, or modifying a particular trace. When the trace facility is started, with a Start Trace command, a foreground trace starts. When the trace facility is stopped with a Stop Trace command, all traces are stopped. When a foreground trace is no longer required, the foreground trace must be stopped and the background trace must be restarted, either by use of the Test 11 trace facility or by a normal IML.

Trace Control Mode

There are four trace control modes. Mode 02 is the default mode if another mode is not selected when setting up a trace.

Mode 01 Do not write to the diskette or fixed disk and do not wrap the trace data area in controller storage.

Mode 02 Do not write to the diskette or fixed disk and wrap the trace data area in controller storage.

Mode 03 Write to diskette or fixed disk without suspend.

Mode 04 Write to diskette or fixed disk with suspend.

How to Use the Trace Facility

Before you attempt to start or stop a trace, the following information must be obtained from the 3174 support center:

- Check digit
- Trace mode (optional)
- Setup ECB number(s) or Setup Trace Function number(s).

Trace Facility Options

- 11,1,Check digit,n,n,n,n.....n Set Up ECB(s) Dispatched
- 11,2,Check digit,n,n,n,n.....n Set Up ECB(s) Returned
- 11,3,Check digit,n,n,n,n.....n Set Up DCB(s) Ports
- 11,4,Check digit,n,n,n,n.....n Set Up Trace Functions
- 11,5,Check digit,nn Set Up Trace Mode
- 11,6,Password Start Trace
- 11,7,Password Stop Trace

11,1 Option The specified ECBs are traced when dispatched. Format = 11,1,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,2 Option The specified ECBs are traced when returned.

Format = 11,2,Check digit,n,n,n,n.....n where n,n,n,n.....n are ECB numbers. The check digit number and the ECB number(s) are obtained from the 3174 support center.

11,3 Option The specified ports are traced.

Format = 11,3,Check digit,n,n,n,n.....n where n,n,n,n.....n are port numbers. The check digit number and the port number(s) are obtained from the 3174 support center.

11,4 Option The specified functions are traced.

Format = 11,4,Check digit,n,n,n,n.....n where n,n,n,n.....n are trace function numbers. The check digit number and the trace function number(s) are obtained from the 3174 support center.

11,5 Option The trace runs in the specified mode.

Format = 11,5,nn where nn are mode numbers 01 through 04. The check digit number and the mode number are obtained from the 3174 support center.

11,6 Option The trace is started.

Format = 11,6,password

The password is obtained from the 3174 support center.

11,7 Option The trace is stopped.

Format = 11,7,password

The password is obtained from the 3174 support center.

How to Start a Foreground Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press TEST to enter test mode.
2. Type in **11,7,Password** (Stop Trace)
3. Type in **11,5,check digit,nn** (Set Up Trace Mode) (This step is optional.)
4. Type in one of the following to set up the desired trace:
 - 11,1,check digit,n,n,n,n.....,n**
 - 11,2,check digit,n,n,n,n.....,n**
 - 11,3,check digit,n,n,n,n.....,n**
 - 11,4,check digit,n,n,n,n.....,n**
5. Type in **11,6,password** (Start Trace)
6. Type in **11,7,password** (Stop Trace)

Note: The password is obtained from the 3174 support center.

How to Start a Background Trace

Perform the following procedure at an attached 3278 or similar terminal.

1. Press and hold ALT; press Test to enter test mode.
2. Type in **11,7,Password**
3. Type in **11,6,Password**

Note: The password is obtained from the 3174 support center.

Test 12, Option 1

This test option shows the Asynchronous Emulation Adapter (AEA) Port Tests Menu, from which you can select a specific terminal, port, or smart-modem to test. See Figure 2-81 on page 2-233 for an example of the test menu.

```

_____Asynchronous Emulation Adapter Port Tests_____

Option      Description

  1,PN,HG      Connect to smart-modem
  2,PN,HG      AEA port wrap
  3,PN,HG      Transmit data (default settings)
  3,PN,HG,WXYZZ Transmit data (override settings)

PN=Port Number (0-7)   HG=Hardware Group (21-23)
WXYZZ=Override port and station descriptor values

NOTES:
- Use MENU REQUEST key sequence to return to this menu
  when above options are selected
- Option 2 requires a wrap plug on requested port
- Use TEST REQUEST key sequence to return to 3174 TEST mode

Select option; press ENTER ==> _

PF:  3=Quit                      12=Disconnect

```

Figure 2-81. Asynchronous Emulation Adapter Port Tests Menu

Option 1. Select option 1 on the Asynchronous Emulation Adapter Port Tests Menu to access and test a smart-modem through its Asynchronous Emulation Adapter port, provided that port is not presently in session. Access and manipulation of the modem, using that modem's command syntax, enables the following:

- Modem Customizing and Test

This function provides access to internal diagnostic and customizing procedures built into certain smart-modems. There are two reasons why this function is important:

1. By running diagnostics internal to the modem, you will be able to isolate a problem in the asynchronous communication equipment on a specific port, provided proper operation of the Asynchronous Emulation Adapter port has already been verified.
2. By customizing the modem to certain specifications, you can ensure proper operation or verify whether or not the modem had been customized correctly for normal operation.

- Modem Dial-out Function

This function enables you to test the dial-out capability of the modem. By providing a number to the modem of a phone nearby or of an actual ASCII dial-in port, you can verify proper operation of the modem.

Option 2. Select option 2 on the Asynchronous Emulation Adapter Port Tests Menu to access to an Asynchronous Emulation Adapter port not presently in session. This access allows you to perform a wrap test on the Asynchronous Emulation Adapter port.

Note: The Asynchronous Emulation Adapter wrap plug (P/N 61X4602) must be installed on the port connector before invoking the wrap test.

Online Tests Configuration B

If a modem cable is attached to the port being tested, by installing a wrap plug at the modem end of that cable you can also test the cable.

Option 3. Select option 3 on the Asynchronous Emulation Adapter Port Tests Menu to verify an ASCII terminal's ability to transmit and receive data correctly. From the invoking terminal, you can send data through the Asynchronous Emulation Adapter port connector to a terminal not presently in session. This test will verify the data path and the operation of the terminal receiving the data.

Example of Option 3,PN,HG Test:

1. At any ASCII terminal, terminate the customer application or session (if active) and return to the Connection Menu.
2. For most ASCII terminals, hold down Esc and press T to enter test mode. (For those terminals that do not accept Esc and T for test mode, see the *3174 Terminal User's Reference*, GA23-0332.)
3. At the 3174 Test Menu, select Option 12 (Asynchronous Emulation Adapter Tests).
4. At the Asynchronous Emulation Adapter Test Menu, select Option 1 (AEA Port Tests Menu).
5. At the AEA Port Tests Menu, type in **3,PN,HG** where:
 - PN = Port Number (0–7) of the device being tested
 - HG = Hardware Group (21, 22, or 23) of the device being tested.
6. Press carriage return.
7. The controller responds with a READY message.
8. Perform steps a and b **only** if the device being tested is attached to a switched port with a smart-modem. If the port is nonswitched, go to step 9.
 - a. Type in **ATD9,XXX-XXXX** where:
 - ATD (uppercase characters) must be keyed in while holding the shift key.
 - 9 is the access code (optional), and ,, is two 2-second pauses.
 - XXX-XXXX is the phone number of the smart-modem attached to the device being tested.
 - b. Press carriage return. The controller responds with a CONNECT message.
9. Type in a test message or any string of characters.
The message or characters will not appear on your terminal.
10. Press carriage return. The data will appear on the device being tested.
11. A test message can then be entered at the device being tested and sent back to the invoking terminal by keying in the test message and pressing carriage return.
12. To return to the Asynchronous Emulation Adapter Tests menu, press ESC, hold down CTRL, and press H.

The override settings, indicated by 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.

Note: If you enter override settings, you may also need to change the parameters on the ASCII device(s) you are testing.

The following table shows the values for WXYZZ:

Table 2-29. WXYZZ Override Settings			
W = Line Speed	X = Parity	YY = Flow Control	ZZ = Stop Bits
0 = Auto baud/parity	0 = Auto	00 = None	00 = One stop bit
1 = 300 bps	1 = Mark	10 = CTS	01 = Two stop bits
2 = 600 bps	2 = Space	20 = DTR	
3 = 1200 bps	3 = Even	80 = XON/XOFF	
4 = 2400 bps	4 = Odd		
5 = 4800 bps	7 = None		
6 = 9600 bps			
7 = 19 200 bps			

Test 12, Option 2

Figure 2-82 shows the status of the Asynchronous Emulation Adapter(s) and all devices attached to it.

```

_____Status Summary_____

Port          HG 21          HG 22          HG 23
Address       0 1 2 3 4 5 6 7   0 1 2 3 4 5 6 7   0 1 2 3 4 5 6 7
Attach        d s d d l   s l
Status        1 1 1 0 1 x 0 -   (Disabled)          (Not present)
Station        v v v p h   ? h
Line          . . : . .   *
Host/term     3 A 3   3
LU            +   +

d = direct      l = on          v = video display    . = 0 errors
l = nonswitched 0 = off        p = printer         : = 1-50
s = switched   - = disabled  h = host            | = 51-100
3 = 3270       x = unconfigured ? = unknown  * => 100
A= ASCII       + = in session

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

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

Figure 2-82. Test 12 Status Summary Panel

Port Address: Indicates the terminal port number (0–7) for HG 21, 22, and 23.

Attach: Indicates how the terminal is attached to the Asynchronous Emulation Adapter port.

- blank = No attachment type (port unconfigured)
- d = Direct attachment
- s = Switched attachment
- l = nonswitched attached

Status: Indicates the state of the terminal at the time the status summary was requested.

- Disabled = This Asynchronous Emulation Adapter is in the disabled state.
- Not present = This Asynchronous Emulation Adapter is not installed in the controller.
- 0 = The terminal on that specific port is powered off (no current connection).
- 1 = The terminal on that specific port is powered on (connection present).

Online Tests Configuration B

- x = The port is not configured.
- = The terminal or specific port is in a disabled state (no connections possible, unusable).

Station: Indicates the type of terminal to which that specific port is connected.

- blank = No station type (port unconfigured)
- ? = Unknown station type (no station has connected yet)
- v = Video display station
- p = Printer station
- h = Host station

Line: Indicates the number of parity, framing, and overrun errors that have been recorded on that particular port.

- . = 0 errors recorded.
- :
- | = 51—100 errors recorded.
- * = Over 100 errors recorded.

Host/term: Indicates the type of host with which the terminal is presently communicating.

When STATION type is "v" (video) or "p" (printer) and the Host/term line is:

- blank = No current host connection (if STATUS = 0 or -).
- blank = On connection menu (if STATUS = 1).
- 3 = Connection to 3270 host.
- A = Connection to ASCII host.

When STATION type is "h" (host) and the Host/term line is:

- blank = No terminal is currently connected to this host port.
(If STATUS = 1, the attached terminal is either on the connection menu or awaiting the next connection.)
(If STATUS = 0, the attached terminal has either powered off or connected to another host destination.)
- 3 = A 3270 terminal is connected to this host.
- A = An ASCII terminal is connected to this host.

LU: Indicates whether or not the SNA session is bound and active.

- blank = Session is not bound.
- + = Session is bound (on at least one logical terminal).

Test 12, Option 4

Provides a facility to display the error counters for a particular Asynchronous Emulation Adapter port. The following panel is an example of a disabled adapter and a disabled port.

```
_____Error Counters for PN 02, HG 21_____
Adapter (HG) status:           Disabled
Port (PN) status:             Powered off due to error
Error counters-
Framing error:                 12345
Overrun error:                 54321
Parity error:                  11111
Loopback error:                12129

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

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

Figure 2-83. AEA Error Counters Example: Disabled Adapter and Disabled Port

Test 12, Option 5

Provides a facility to display the connectivity for a particular Asynchronous Emulation Adapter port. The following panel is an example of an enabled adapter and a display/printer connected to an ASCII host.

```
_____Connectivity for PN 02, HG 21_____

Adapter (HG) status:      Enabled
Port (PN) status:        Powered on
Device type:              Video display

Line speed/Parity        1200 / Odd
Flow control/Stop bits   XON/XOFF(XON) / 1

Current connectivity-

  Addr  LT  Bound Host  IDn      HG_PN  Host/Station Name
-----
      1   n/a  n/a           .21_06  ASCII HOST

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

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

Figure 2-84. Connectivity: Enabled Adapter and Display/Printer with an ASCII Host

The second operator must press the RESET key and try again. If the first operator's screen has been transmitted and no other operator has entered an alert, the second operator's entry is honored.

Regardless of the upstream response, the screen is cleared. If a link-level error occurs, the hardware will attempt retransmission of the alert. If the data has been lost because of an error above the link level (DACTPU), the information may be lost without any error indication to the operator.

If an attempt is made to request an operator-generated alert screen from an unauthorized display station, the operator unauthorized indicator is displayed in the operator information area.

If other than the basic characters have been entered from the keyboard, the try again (X ? +) indicator is displayed.

If a communication check is detected, the Input Inhibited and Communication Reminder symbols, followed by a 5xx number, are displayed.

Test D Configuration B: Distributed Function Terminal Dump

This test is only available on 1TEST. You may request a dump of a distributed function terminal, such as a 3290, from a 3278 or similar display station. For example, after a 3290 has been downstream-loaded and a failing symptom is present, remove the diskette from diskette drive 1 or 2, and insert the 3174 dump diskette (P/N 73X3726). When the diskette is removed from the 3174, a status code of 38X may appear in the Status indicators. This is a normal indication and stops when the dump diskette has finished loading its control program into controller storage.

Perform the following steps to request a dump of a distributed function terminal.

1. Remove the diskette from drive 1 or 2 and insert the 3174 dump diskette.
2. At an attached terminal, press and hold ALT; press TEST.
3. Type in **/d,n** (n = The port number of the DFT). When the request is successfully received and the dump is initiated, a plus sign (+) will appear adjacent to the n:

`/d,n+`

While the dump is in progress, alternating codes 4671 and 4672 display in the Status indicators on the 3174. After approximately 10 minutes, the dump is completed and a 4675 is displayed in the 3174 Status indicators.

4. Remove the dump diskette.
5. Reinstall the previously removed diskette.
6. Exit test mode.

The terminal for which the dump was taken requires a power-on reset. This ensures a new downstream load of that terminal.

Note: Only one DFT dump is allowed at any given time. If a request is entered for a port that is powered off and does not have a DFT connected (this is a valid request), a DFT dump cannot take place. In approximately 20 seconds, a timer will abort the dump request and clear the DFT dump facility resource. During these 20 seconds, if another dump request is entered, a wrong number indicator appears in the indicator row.

If the DFT dump test request is rejected, one of the following may appear.

X-f appears if another DFT dump is already in progress.

/d,n- appears if a 3174 dump diskette is not available in one of the controller diskette drives.

X #? appears if the terminal that was selected to be dumped is not a distributed function terminal.

General Procedures

This section describes the following procedures:

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

How to Display the Master Menu

The Master Menu (Figure 2-86) lists the utilities available on the Utility diskette or fixed disk. From this menu, you select the option you want.

To display the Master Menu **using the Utility diskette**:

1. Insert the Utility diskette into diskette drive 1.
2. Press and hold Alt 1.
3. Press and release IML.
4. Release Alt 1.
5. 40 is displayed.
6. Press Enter. The Master Menu is displayed on the terminal connected to port 0 on the 3174.

To display the Master Menu **using the fixed disk**:

1. Press and hold Alt 1.
2. Press and release IML.
3. Release Alt 1.
4. At 40, key in **0340** (for fixed disk).
5. Press Enter. The Master Menu is displayed on the terminal connected to port 0 on the 3174.

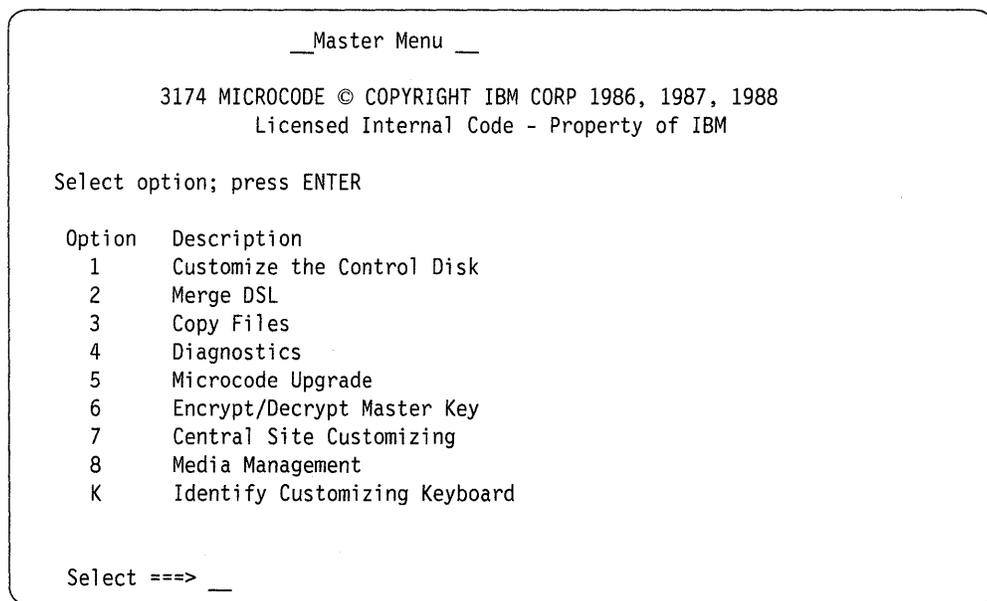


Figure 2-86. Master Menu Configuration A5.0 and S5.0

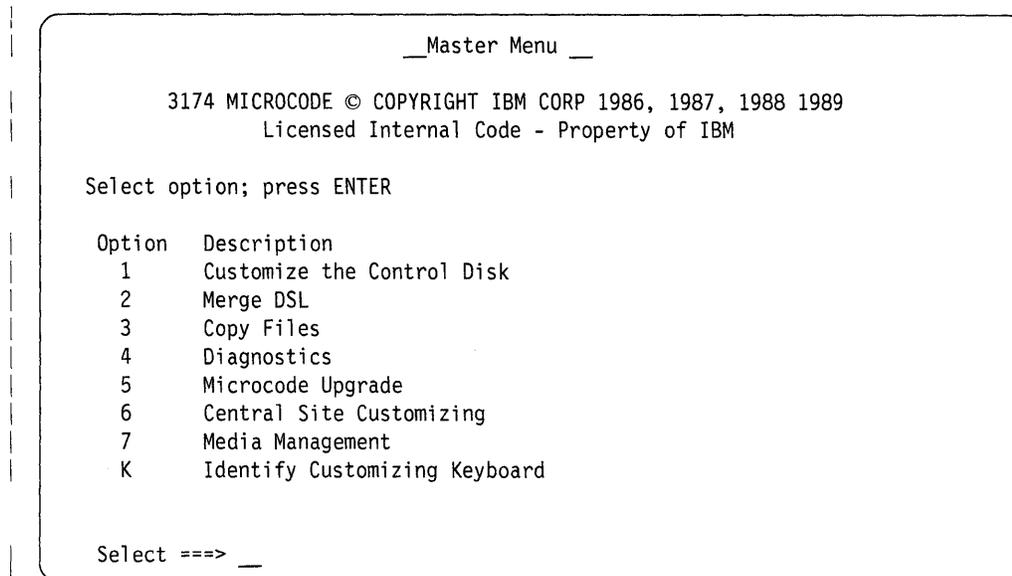


Figure 2-87. Master Menu Configuration B1.0

Customize the Control Disk

Some customizing requires that hardware and software configuration information be either specified or modified on the Control disk that will be used to make a 3174 operational; for example, defining host, device, and printer attachments, modifiable-keyboard types, and RPQs. When you select this procedure, a second menu is displayed. See the *3174 Utilities Guide* for the procedure.

Merge DSL Code

For DSL displays or for the Asynchronous Emulation Adapter (both of which require the controller to downstream-load microcode), there is a separate DSL disk. During this procedure, you merge one DSL disk onto another DSL disk. See *3174 Utilities Guide* for this procedure.

Copy Files

This selection allows you to duplicate valid 3174 disks— for example, 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.

Encrypt/Decrypt

If you have ordered the Encrypt/Decrypt feature for your 3174, you need to use this procedure. The Encrypting/Decrypting procedure protects data from unauthorized disclosure by encrypting data sent from the 3174 to the host system and by decrypting data received by the 3174 from the host system. Only authorized persons should use this procedure. See the *3174 Utilities Guide* for this procedure.

General Procedures

Central Site Customizing

Central Site Customizing allows you to tailor control unit microcode for each controller in a network at a central location. The tailored microcode can then be sent electronically (if you are using the NetView™ Distribution Manager software package) or physically (on a diskette) to the various controllers in the network, while a copy of the customizing is stored at the central site for future reference. See the *3174 Central Site Customizing User's Guide* for more information on this procedure.

Media Management

If your 3174 Establishment Controller is equipped with at least one fixed disk drive, you may wish to perform this procedure. The Media Management procedure provides a means for managing the data resident on a fixed disk. You may use this procedure to set up a fixed disk in order to IML from it, or you can use this procedure to delete subdirectories that are stored on it. The *3174 Utilities Guide* describes the procedure.

Identify Customizing Keyboard

During this procedure, you identify on a Utility disk the keyboard of the display you are using to customize. The keyboard you specify will be supported on that disk for *all* other customizing procedures *and* any time you recustomize using that disk. See the *3174 Utilities Guide* for more detail on this option.

NetView is a trademark of the International Business Machines Corporation.

How to Perform the Coaxial Cable Ground Loop Check

CAUTION:

Do not connect or disconnect cables during periods of lightning activity. (For translations of this safety notice, see Safety Notice 5 in *IBM 3174 Safety Notices*, GA27-3824.)

CAUTION:

To avoid the possibility of electrical shock, disconnect all power plugs before connecting or disconnecting cables. Do not reconnect power plugs until connection or disconnection of the cables is completed. (For translations of this safety notice, see Safety Notice 1 in *IBM 3174 Safety Notices*, GA27-3824.)

This procedure is used to test for ground loop problems on each terminal connected by coaxial cable to the controller. This procedure is not to be used with either the IBM Cabling System or telephone twisted-pair cable.

A ground loop is a condition where earth ground is connected to the controller from an external ground source. Ground loops can cause intermittent problems on terminals or other equipment connected to the subsystem. Most ground loops occur through shield problems of the coaxial cable, keyboard grounds, or an internal short in the connected terminal. The shield of the coaxial cable is connected to DC ground. DC ground is only connected to earth ground in the controller but not in the terminals or terminal multiplexers.

Step 1: AC Voltage Check

At the terminal end of the coaxial cable being tested, check for AC voltage between the coaxial cable shield and the terminal frame.

Note: Do not disconnect the coaxial connector from the terminal until you are directed to do so later in this procedure.

- a. Set the terminal power on.
- b. Set the meter range to measure AC line voltage.
- c. At the terminal, connect the meter between the coaxial connector shell and the terminal frame. Do not physically touch either surface.
- d. If the meter indicates an AC voltage less than 1 volt, go to "Step 2: Coaxial Resistance Check." If the meter indicates an AC voltage greater than 1 volt, AC ground is not correct. **A hazardous condition exists.** The power cord may be damaged or the AC power source may not be grounded correctly.
- e. Set the terminal power switch to OFF.
- f. If the terminal is an IBM terminal, remove the power cord from the voltage source and check the terminal power supply for broken insulation, arcing, and the correct wiring of the power cord. If the terminal is not an IBM terminal, notify the customer that there is a ground problem on the terminal or the power source is wired incorrectly. If no problem is found in the terminal, have the customer call an electrician to check the grounding and wiring of the AC power source.
- g. Do not continue until the problem is repaired. Repeat steps a through d to verify the repair and continue the ground loop check.

Step 2: Coaxial Resistance Check

At the terminal end of the coaxial cable being tested, check resistance in the coaxial cable.

- a. At the terminal, set the Power switch to the Off Position.
- b. Connect the meter between the coaxial connector and the terminal frame.
- c. Set the meter to the lowest resistance scale.
- d. The meter should indicate a reading between 0 and 6 ohms. If the meter reading is correct, go to "Step 3: Terminal Ground Check" on page 2-246.

General Procedures

- e. If the reading is higher than 6 ohms, there is a high resistance because the coaxial cable shield is not grounded correctly at the controller end of the cable.

This may be caused by:

- An open coaxial shield
 - An open coaxial cable (not connected at the controller).
- f. Do not continue until the problem is corrected. After the problem is corrected, repeat steps a through d to verify the repair and continue the ground loop check.

Step 3: Terminal Ground Check

At the terminal end of the coaxial cable being tested, check for a ground on the coaxial cable connector in the terminal.

- a. Disconnect the coaxial cable from the terminal.
- b. Connect the meter between the coaxial connector body (on the terminal) and the terminal frame.
- c. Set the meter to the highest resistance scale.
- d. If the meter does not indicate a reading of infinity or a very high resistance, there is a short to ground in the terminal between the coaxial connector body and the terminal frame ground. If the meter reading is correct, go to "Step 4: Coaxial Cable to Terminal Check."
 - If this is an IBM terminal, repair the short in the terminal. Repeat steps a through d to verify the repair. If this is not an IBM terminal, report the problem to the customer. The customer is responsible for the repair or replacement of non-IBM devices. After the terminal is repaired, repeat steps a through d to verify the repair.
- e. Connect the coaxial cable to the terminal.
- f. Go to the controller to continue the ground loop check.

Step 4: Coaxial Cable to Terminal Check

At the controller end of the cable, check for a ground in the coaxial cable.

- a. At the controller:
 - 1) Disconnect the coaxial cable from the controller coaxial connector.
 - 2) Set the meter range to the highest resistance scale.
 - 3) Connect the meter between the coaxial cable shell and the controller frame.
 - 4) If the meter does not indicate a reading of infinity or a very high resistance (meg-ohms), there is a low resistance ground in the coaxial cable. If the meter reading is correct repeat Step 4 on any remaining coaxial cables.

This may be caused by:

- A pinched coaxial cable
 - A grounded shield on the coaxial cable
 - A bad lightning protective device on the coaxial cable.
- b. Have the customer correct the problem.
 - c. When the problem is corrected, repeat steps a 1) through a 4) to verify the repair.

If all problems have been repaired or there are no failures of the coaxial cable that was just tested:

- a. Reconnect the coaxial cable at both ends.
- b. Set the Power switch on the terminal to the ON position.
- c. Repeat Step 4 on any remaining coaxial cables.

How to Check for a Terminal-Ready Condition (S, 4, or 6 Indicator)

This procedure is used to isolate terminal problems by exchanging a known working terminal, such as a 3278, 3279, 3290, or printer, with another terminal or a 3299 Terminal Multiplexer.

1. At the terminal to be tested, switch the Normal/Test switch from Normal to Test and back again or perform a power-on reset. Some terminals require up to 2 minutes to complete a power-on reset.
2. Check the terminal for the ready symbol (S, 4, or 6) in the operator information area. For printers, check for the appropriate ready indicator. For some terminals, such as a personal computer, you may need to change its mode to allow 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 an Operator Panel Lamp Test

To test the LEDs in the operator panel display, press and hold the IML pushbutton. All the LEDs should light indicating 8888.

Modem Specifications and Switch Settings

Modems

The Asynchronous Emulation Adapter feature supports leased line, switched line, and limited distance modems that provide full-duplex asynchronous operation, and equal transmit and receive speeds, and that conform to EIA 232D specifications. The AEA feature also supports auto-call modems that conform to the EIA 232D specifications and to the IBM Attention Command Set (AT), the Hayes AT command set, the Microm⁴ auto-dial procedure, or AEA manual calling requirement.

Note: The following information on modem specifications and switch settings apply to modems connected to an Asynchronous Emulation Adapter (AEA) port.

IBM 5841 and 5842, Hayes SmartModem 300 and 1200, and Microm Data Modems, Models 3012 and 3024, are intelligent modems supported for auto-dial to ASCII hosts. The dial strings may be either stored in the 3174 at customizing, or entered from a display station keyboard (manual dial).

For automatic calling (autocall), the AEA's interface to IBM, Hayes, and Microm intelligent modems conforms to the specification in the documentation supplied with each modem. For manual calling, the AEA acts only as a conduit for a user-to-modem conversation; the user represents the interface to the intelligent modem, and must have a detailed understanding of the modem's commands and responses.

These modems should be set up following these general specifications:

- Asynchronous, EIA 232D transmission
- 300 or 1200 bits per second (IBM 5842 can operate at 2400 bits per second)
- Auto-answer or auto-dial
- For auto-dial operation, 9- or 10-bit character length (start, parity, and stop bits are included) is required.

⁴ Trademark of Microm Systems, Incorporated.

IBM 5841 and 5842 Setup

IBM 5841 and 5842 modems are operated in Attention Command Set (AT) mode; any parameters set by commands that are required for operation with the AEA feature are the same as for Hayes modems. However, the switch settings for IBM 584x modems are not compatible with Hayes, and must be set as specified here.

For the IBM 5842 modem, the six front panel switches must be in the "out" position. In addition, the eight configuration switches must be set as described in Table 2-30.

Switch Number	Option Name	Switch Setting	Description
1	Receive Line Signal Detect (RLSD)	ON	RLSD (also called 'Carrier Detect') is raised at connection time.
2	Reset to Default Options on Loss of DTR	OFF	When this switch is set to OFF, the 3174 can reset the modem to a known state by dropping DTR. If register settings are not required for special installation requirements, this reset can be used to avoid unexpected results that can arise from previous use. Not used on 5841.
3	Transmit Timing Option (Synchronous mode only)	Not Used	
4	Asynchronous or Synchronous Mode	ON	Asynchronous mode is used.
5	Source of Data Terminal Ready (DTR)	ON	AEA controls DTR.
6	Transmit Clocking from Remote Modem (Synchronous Mode Only)	Not applicable	
7	Request to Send (RTS)	OFF	AEA controls RTS.
8	Data Set Ready (DSR)	ON (5841 only) OFF (5842 only)	DSR must always be on for 5841. DSR is raised at connection for 5842.

Hayes SmartModem 1200 Setup

A Hayes SmartModem 1200⁵ should be set up as described in Table 2-31. Once the Hayes modem is turned on, many of the operating parameters or default values may be overridden by keyboard commands entered during Online Test 12 (/12 test). See "Test 12: Asynchronous Emulation Adapter Tests" on page 2-170 for Test 12 procedures. In Table 2-31, a register number is the Hayes S Register number that can be set by sending commands to the modem from the keyboard.

Switch Number	Option Name	Switch Setting	Description
1	Data Terminal Ready (DTR)	UP	The station supports DTR.
2	Connection indication state format	UP	The results are sent as messages in English (also see V command).
3	Connection state indication	DOWN	Results are sent (also see Q command).
4	Command mode echo	UP	All characters sent to the modem while it is in command state are echoed back to the display.
5	Automatic answer	UP	The modem answers incoming calls (after a number of rings specified in register S0 [default = 1]).
6	Carrier Detect (CD) lead handling	UP	Carrier Detect reflects carrier (DOWN during command mode).
7	Telephone jack	Not Used	UP = Single line RJ11 jack DOWN = Multiple line RJ12 or RJ13 jack. Should match your installation.
8	Command mode recognition	DOWN	The modem recognizes its commands before connection and its command mode escape during a connection.

⁵ Trademark of Hayes Microcomputer Products, Incorporated.

Table 2-32. Hayes SmartModem 1200 S Register Settings	
Register Number	Description
0	Ring to answer on. See switch 5 in Table 2-31 on page 2-249. Not relevant to AEA operation.
2	Escape code. Not relevant to AEA operation.
3	Carriage return code. Command and result code terminator can be changed for nonstandard equipment. Set to 13 (default).
4	Line feed code. Line feed follows carriage return when English result codes are selected. Set to 10 (default).
5	Backspace code. Not relevant to AEA operation.
6	Wait for dial tone (default=2 seconds). The amount of time the modem waits for dial tone. Not relevant to AEA operation.
7	Wait for carrier (default=30 seconds). The amount of time the modem waits for the remote station to answer before terminating the call. Not relevant to AEA operation.
8	Pause time (caused by comma in dial string)(default=2 seconds). Not relevant to AEA operation.
9	Carrier Detect Delay. Not relevant to AEA operation.
10	Delay time between carrier loss and outage notification (default=.7 second). Not relevant to AEA operation.
11	Tone dialing speed (default=0.070 second). Should be set to match the central telephone switch of PBX. Not relevant to AEA operation.
12	Escape to command mode guard time (default=1 second). Not relevant to AEA operation.
16	Self Test mode (default=0). This may be set to 1 by using online Test 12 to run modem tests. For 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: Asynchronous Emulation Adapter Tests" on page 2-170 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 that all patch data has been keyed in correctly. Sixty patches can be installed on the Control diskette, 60 on the Utility diskette, and 60 on the DSL diskette.

PC Patches

PC patches are applied only to the link-edited microcode that is on the Control diskette. PC patches are prefixed with the letters "PC." PC patches are not connected in any way with the IBM Personal Computer. When these patches are added, they are displayed on the patches panel of the Control diskette. When a PC patch is added, data is entered only on those panels that are required for the patch being added. When a panel is displayed that does not require any input, use 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, or DSL diskette. Zap patches are prefixed with the letters "ZC," "ZU," or "ZM." ZC means the patch is applied to the microcode on the Control diskette. ZU means the patch is applied to the microcode on the Utility diskette. ZM means the patch is applied to the microcode on the DSL diskette.

Processing a Patch

This procedure provides the capability of including a patch during an IML, omitting a patch from IML, or deleting a patch from the Control, Utility, or DSL diskette.

Starting the Patch Procedure

1. Load the Test Monitor. See "How to Load the Test Monitor" on page 2-84.
2. At 40, press ENTER.
3. Go to the terminal connected to port 0.
The Master Menu is displayed. See Figure 2-88.

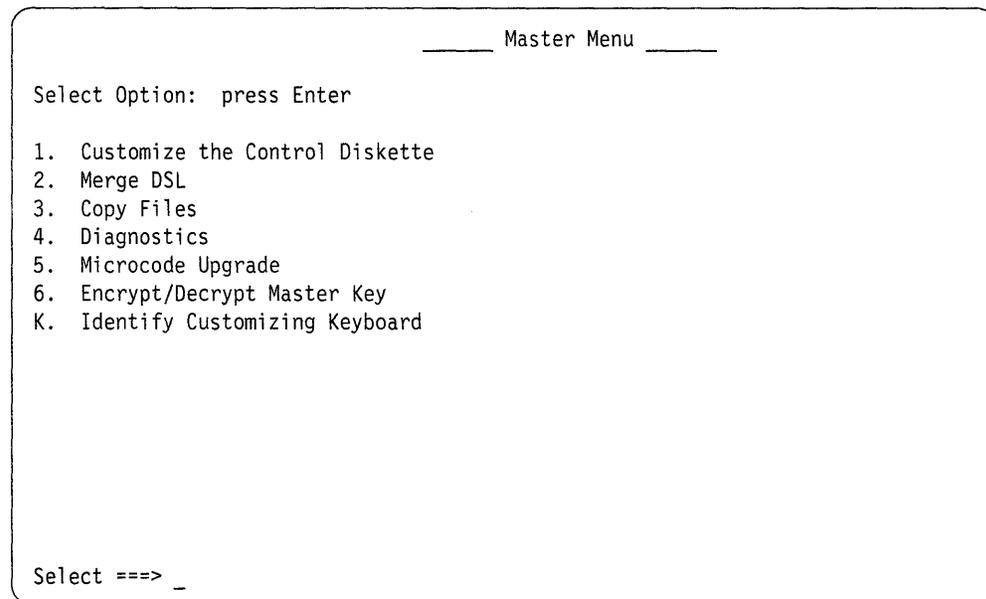


Figure 2-88. Master Menu

4. Type in **P**
5. Press ENTER. The Patch Menu is displayed on your screen. See Figure 2-89.

General Procedures

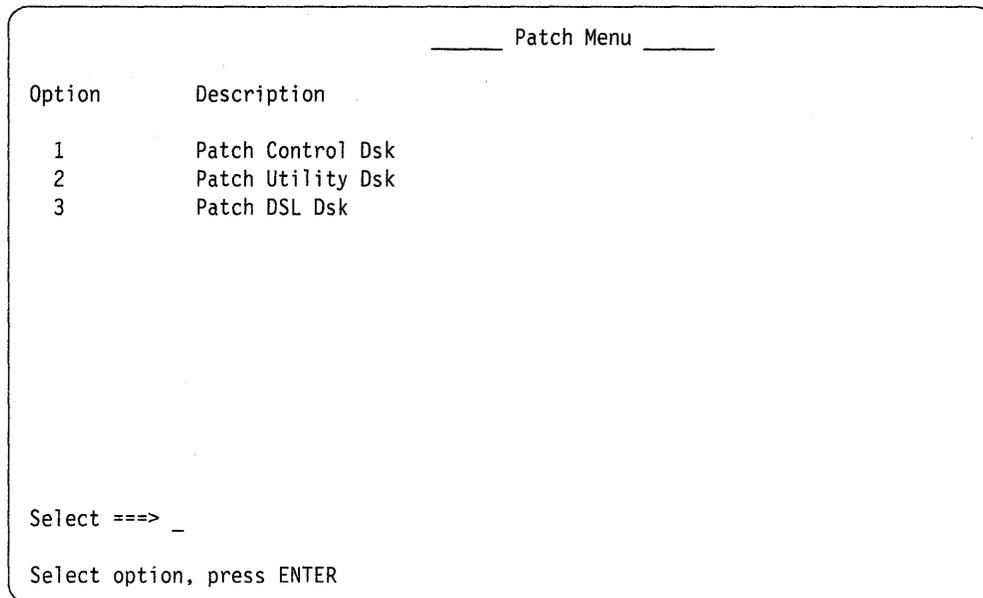


Figure 2-89. Patch Menu

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

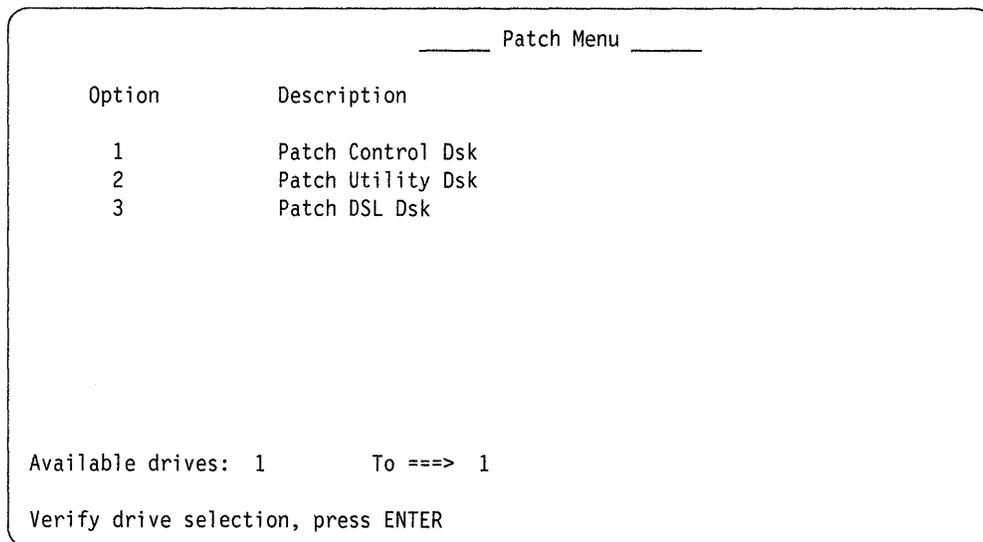


Figure 2-90. Diskette Drive Selection Menu

8. Type in **1** or **2** for your To (or target) drive. For example, if you have two diskette drives installed (Available drives would be 2) and you wish to use drive 2 for the diskette being patched, change the target number to 2. Of course if you have only one diskette drive installed, you must leave the target number 1.
9. Press ENTER. The following panel is displayed on your screen.

_____ Patch Menu _____	
Option	Description
1	Patch Control Dsk
2	Patch Utility Dsk
3	Patch DSL Dsk
Available drives: 1 To ==>> 1	
Insert XXX disk, press ENTER	

XXX = the diskette you selected to patch.

Figure 2-91. Diskette Drive Selection Menu

10. Insert the selected diskette into the target drive.

11. Press ENTER.

The Patches panel is displayed (see Figure 2-92).

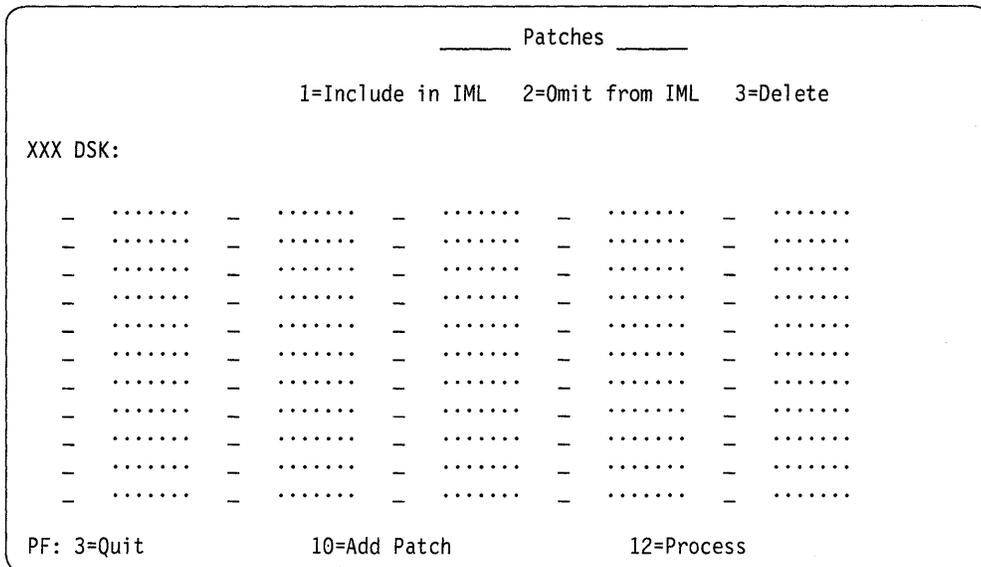
To add a patch, go to "Adding a Patch."

To add a Zap patch, go to "Adding a Zap Patch" on page 2-257.

To process a patch(es), go to "Processing an Existing Patch" on page 2-259.

Adding a Patch

The Patches panel shown in Figure 2-92 does not show any patches installed. If patches were previously installed, the patch numbers would be displayed with a 1 or 2 next to the patch number.



XXX = the diskette you selected to patch.

Figure 2-92. Patches Panel

1. Press PF10.

The following panels are displayed:

- a. Patch Header panel (see Figure 2-93 on page 2-255)
- b. Patch Data panel (see Figure 2-94 on page 2-255)
- c. Relocatable Information panel (see Figure 2-95 on page 2-256)
- d. Call to Patch Area panel (see Figure 2-96 on page 2-256).

2. Fill in the fields as required for the patch being added.

3. Press PF12 (or PA2 on keyboards that do not have a PF12 key).

The patch processes and the Patches panel appears with the new patch number displayed.

Enter data only on the panels required by the patch being installed. If the patch data does not indicate a particular panel must be filled in, press PF8 to bypass that panel.

```
_____ Patch Header _____  
  
Patch ID ..... _____  
Microcode Level ..... _____  
Line Count ..... _____  
Clan ..... _____  
Selection Criteria ..... 001F  
Check Digit..... _____  
  
PF :3=Quit           8=Fwd
```

Figure 2-93. Patch Header Panel

```
_____ Patch Data _____  
  
CSECT Name ..... _____ CSECT Alignment.....004.  
  
Text          Text          Check  
Offset        Code/Data      Digit  
  
_____      _____      -  
_____      _____      -  
_____      _____      -  
_____      _____      -  
_____      _____      -  
  
PF: 3=Quit           8=Fwd           11=More
```

Note: On keyboards such as Data Entry that do not have a PF11 key, use PA1.

Figure 2-94. Patch Data Panel


```

          _____ Patch Header _____

Patch ID ..... _____
Microcode Level ..... _____
Line Count ..... _____
Clan ..... _____
Selection Criteria ..... 001F
Check Digit..... _____

PF :3=Quit          8=Fwd
    
```

Figure 2-98. Patch Header Panel (Adding a Zap Patch)

```

          _____ Zap Patch _____

DOS File Name .....          Extension ...

Text          Text          Check
Offset       Code/Data     Digit

_____ VER _____ -
          REP _____ -

PF: 3=Quit          12=Apply ZAP
    
```

Figure 2-99. Zap Patch Panel

Processing an Existing Patch

The panel in Figure 2-100 shows one patch installed on the Control diskette. Option 2 is in the field next to the patch number, which means this patch is not loaded when a normal IML is performed. To change this option:

1. Move the cursor under the 2.
2. Type in 1 or 3 where:
 - 1 loads the patch when a normal IML is performed
 - 3 deletes the patch from the diskette.

Warning: When option 3 is entered, the patch is deleted when PF12 is pressed. Be sure the patch selected for deletion is the correct patch number.

3. Press PF12 (or PA2 on keyboards that do not have a PF12 key).

The patch processes and the Patches menu reappears reflecting the changed option number or deleted patch.

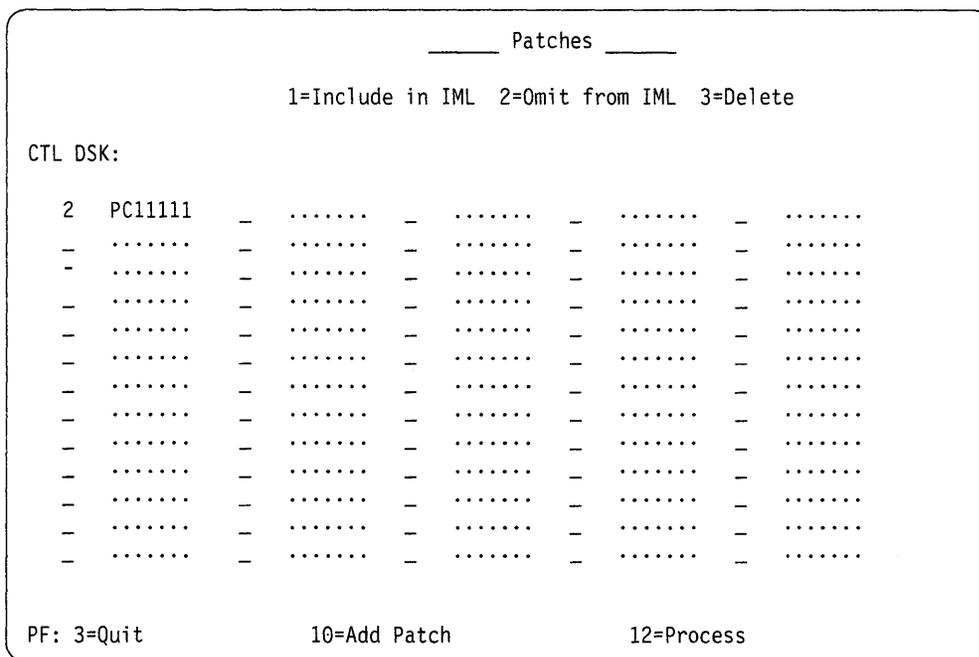


Figure 2-100. Patches Panel with One Patch Installed

How to Use the 3174 Dump Procedure

The 3174 dump procedure is a standalone program that is contained on its own diskette. The diskette (P/N 73X3726) is obtained from an IBM Parts Distribution Center. The following information can be retrieved from the controller by use of the dump procedure:

- Controller Storage and Register Space
- Controller Memory Mapped I/O (MMIO)
- Control Diskette Link-Edit Map
- Control Diskette Configuration Files
- Control Diskette Event Log and Trace.

The dump procedure is performed at the 3174 operator panel. The 3174 must be offline from the host system. This procedure requires a 3174 dump diskette and is performed when the controller is in its failing state.

Note: Multiple dump diskettes may be required to dump all of machine storage.

1. Remove the diskette from diskette drive 1.
2. Insert the 3174 dump diskette.

Warning: If the following steps are not performed properly, the dump information may be DESTROYED.

3. Press and hold Alt 1; press and release IML.
4. At 31, release Alt 1.
5. At 40, press Enter.
6. The following status codes are displayed:
5901 5902 5903 5904 5905
7. At 5907, remove the Dump diskette and insert the control diskette.
Do NOT press any operator panel keys at this time.
8. The following status codes are displayed:
5908 5909
9. At 5910, remove the Control diskette and insert the original dump diskette.
10. The following status codes are displayed:
5912 5913
11. If status code 5914 is displayed, remove the dump diskette and insert another dump diskette. If 5914 does not display, go to the next step.
12. At 5916, remove the dump diskette. The dump is completed. Save this diskette for analysis.
13. If 5917 or 5918 is displayed, the contents of the dump may not be valid. In that case, record the additional fields and perform the following procedure:
 - a. Remove the dump diskette.
 - b. Save this dump diskette for analysis.
 - c. Perform an Alt 2 IML to verify proper operation of the controller. See "Alt 2 IML Procedures (Test 82)" on page 1-45.

- d. Re-create the failure.
- e. Perform the dump procedure again.
- f. Save this dump diskette for analysis.

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

How to Analyze a 3174 Dump Failure

This procedure provides an analysis of status codes 5917 and 5918. These status codes can occur while performing the 3174 dump procedure if a failure occurs in machine storage. The following describes the additional fields of status code 5917 and 5918.

591X WX00 BNB BNB

WX indicates the dump copy status of files that are required to be copied from the Control diskette that was being used at the time of the failure. Depending on the problem that has occurred with the controller, not all files are required to analyze a dump. Use your support structure to determine if the dump was valid.

BN = The block number of main storage or MMIO adapter on card storage, in 256KB blocks, that contained an ECC or parity error. Normally, storage errors should not be indicated during a dump procedure. The FRU(s) in the location indicated with errors are suspect and should be exchanged.

- | | | |
|---|-----|---|
| W | = 0 | All required W files copied |
| | = 1 | Log/Trace files not copied |
| | = 2 | Configuration files not copied |
| | = 3 | Log and configuration files not copied |
| | = 4 | FRU ID file not copied |
| | = 5 | Log and FRU ID files not copied |
| | = 6 | Configuration and FRU ID files not copied |
| | = 7 | Log, configuration, and FRU ID files not copied |
| X | = 0 | All required X files copied |
| | = 1 | Panel information table not copied |

BN	Description	FRU Location
01	Main storage	Planar
02	Main storage	Planar
03	Main storage	Planar or Location 05 *
04	Main storage	Planar or Location 05 *
29	MMIO Adapter	Location 04
31	MMIO Adapter	Location 04

* If the planar board is type number 9021 or 9221, block numbers 03 and 04 are in location 05.

3174 Models 51R, 52R, 61R, and 62R Controller OLTs

These online tests (OLTs) provide path testing for the 3174 Models 51R, 52R, 61R, and 62R controllers host attachment downline from a 270x or a 370x. (See Table 2-33.)

Warning: While running OLTs, DO NOT PRESS any keys on any terminals attached to the controller being tested. False errors or unexpected failures may occur.

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.

Applicable Executive Control Program

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

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

Configuration	OLT User's Guide	OLT
3174 Models 51R and 61R, BSC operating with a 270x, or a 370x with the Emulator Program (EP).	D99-3174B	R3174A
3174 Models 51R and 61R 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	R3174B
3174 Models 51R, 52R, 61R, and 62R SDLC operating with a 370X NCP. Use the following Link Level Tests:		
	D99-3700A	
Link Level 1	D99-3700C	T3700LTE
Link Level 2	D99-3705A	T3705

Chapter 3. Repair Information

Introduction	3-2
Microcode Level Support	3-2
Type Numbers and Hardware Group	3-5
Removal/Replacement Procedures	3-6
Feature Card Removal	3-6
Feature Card Replacement	3-6
Storage Card Removal Models 61R, 62R, and 63R	3-7
Asynchronous Emulation Adapter I/O Panel and Cable Removal/Replacement	3-8
Token-Ring Adapter Card Removal	3-9
Power Supply Removal/Replacement	3-10
Operator Panel Removal/Replacement	3-11
Diskette Drive 2 Removal/Replacement	3-12
Diskette Drive 1 Removal/Replacement	3-13
Fixed Disk Removal/Replacement	3-14
Fan F1 Removal/Replacement	3-16
Fan F2 Removal/Replacement	3-17
AC Line Filter Removal/Replacement	3-18
Planar Board Removal	3-19
Planar Board Replacement	3-21

Introduction

This chapter contains 3174 locations and removal/replacement procedures.

Microcode Level Support

The following chart is included to aid in determining what present microcode levels support.

Feature	A4.0	S4.0	A5.0	S5.0	B1.0
Min. Storage Required	1MB	1MB	2MB	2MB	2MB
Max Storage Supported by operational code	3MB	3MB	4MB	4MB	4MB
9051 512KB Storage card	YES	YES	NO	NO	NO
9052 1MB Storage card	YES	YES	YES	YES	YES
9053 2MB Storage card	YES	YES	YES	YES	YES
926X Concurrent Communication Adapter	NO	NO	NO	NO	YES
933X Asynchronous Emulation Adapter	YES	YES	YES	YES	YES
9350 4MB Token-ring	YES	YES	YES	YES	YES
9351 4/16MB Token-ring	NO	NO	YES	YES	YES
Token-Ring Gateway feature	NO	YES	NO	YES	YES
9111 1.2MB diskette drive 1 Models 51R, 52R, and 53R	YES	YES	YES	YES	NO
9112 1.2MB diskette drive 2 Models 51R, 52R, 53R, 61R, 62R, and 63R	YES	YES	YES	YES	NO
9115 2.4MB diskette drive 1 Models 51R, 52R, 53R, 61R, 62R, and 63R	note 3	note 3	YES	YES	YES
9116 2.4MB diskette drive 2 Models 51R, 52R, 53R, 61R, 62R, and 63R	note 3	note 3	YES	YES	YES
9132 Fixed disk	YES	YES	YES	YES	YES
948x Storage Card 1MB (see note 1)	NO	NO	YES	YES	YES
948x Storage Card 2MB (see note 1)	NO	NO	YES	YES	YES
3299 Models 1, 2, and 3	YES	YES	YES	YES	YES

Notes:

1. On Release A5.0/S5.0 and later, the configuration of the storage cards is restricted on Models 61R, 62R, and 63R. See Table 3-3 on page 3-7.
2. Model 52R is not supported on Configuration Support B.
3. A5.0/S5.0 supports 2.4MB in 1.2MB mode only.

Figures 3-1 through 3-3 illustrate the front-panel, back-panel, and internal locations of the 3174.

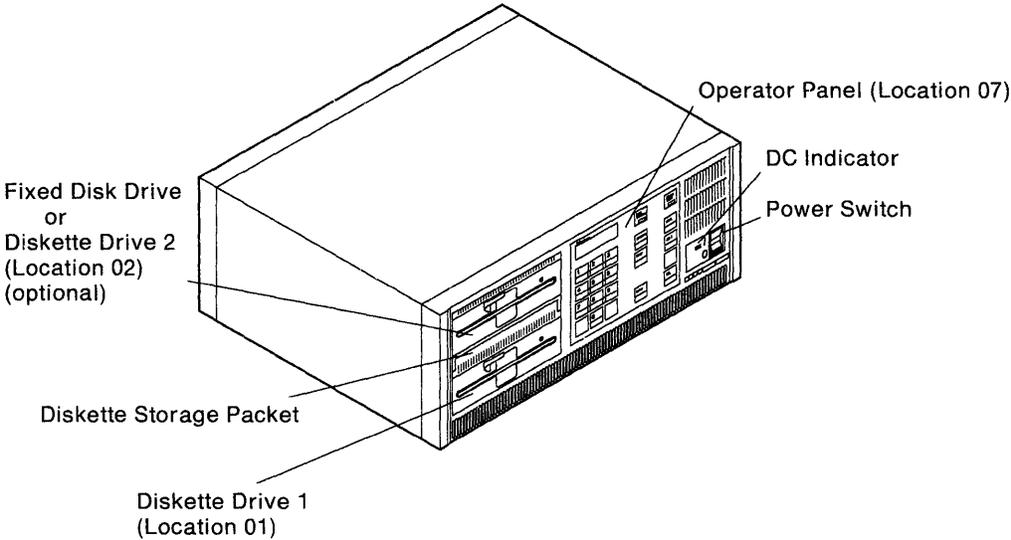


Figure 3-1. 3174 Front Panel Locations

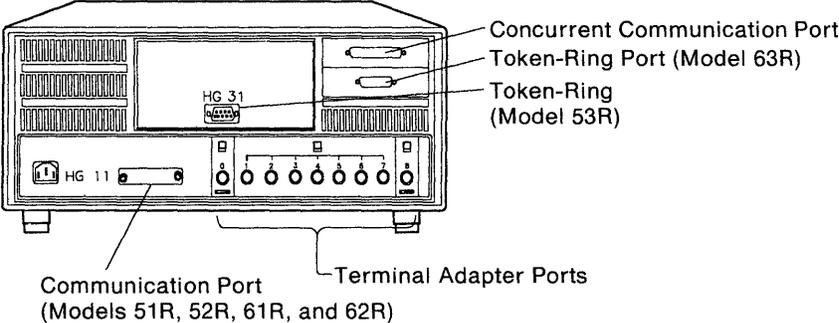
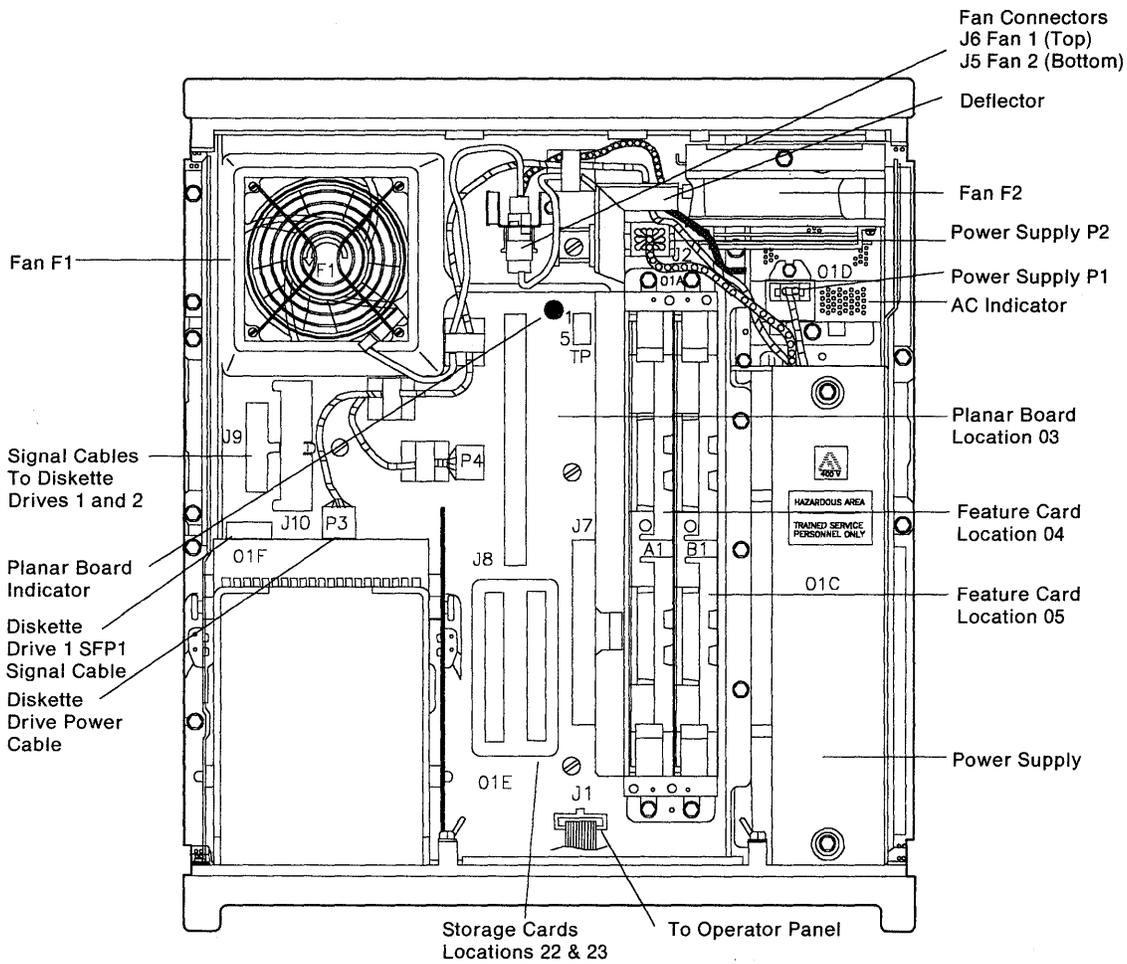


Figure 3-2. 3174 Back Panel Locations



Note: Diskette drive 2 connectors are on Models 51R, 52R, and 53R (Models 61R, 62R, and 63R are numbered differently):
 Signal Cable SF2P1
 Power Cable P4

Figure 3-3. 3174 Internal Locations

Type Numbers and Hardware Group

Table 3-2. Type Numbers and Hardware Group		
Type	HG	FRU
0000		Invalid or Unknown
9000		Empty card location
9001		Invalid card/condition
9021		Planar Board 51R (EIA/V.35)(512KB)
9022		Planar Board 53R (1MB)
9025		Planar Board 51R (EIA/V.35)(1MB)
9051	87	512KB Storage Card
9052	87	1MB Storage Card
9053	87	2MB Storage Card
9111	01	Diskette 1 (base) 1.2MB Models 51R, 52R, and 53R
9112	02	Diskette 2 (feature) 1.2MB Models 51R, 52R, and 53R
9115	01	Diskette 1 (base) 2.4MB Models 51R, 52R, and 53R
9116	02	Diskette 2 (feature) 2.4MB Models 51R, 52R, and 53R
9133	03	Fixed Disk Drive Models 51R, 52R, 53R, 61R, 62R, and 63R
9221		Planar Board 52R (X.21)(512KB)
9225		Planar Board 52R (X.21)(1MB)
9263	51,52	Type 1 Concurrent Communication Adapter (EIA/V.35)
9267	52,52	Type 2 Concurrent Communication Adapter (X.21)
933X	21	Asynchronous Emulation Adapter
9350	31	Token-Ring Adapter (4Mbps)
9351	31	Token-Ring Adapter (16/4Mbps)
9421	01,02	Diskette Drive 2.4MB Models 61R, 62R, and 63R
9422	02	Diskette Drive 1.2MB Models 61R, 62R, and 63R
9431	03	Fixed Disk Drive Models 61R, 62R, and 63R
9481	87	Storage 2MB
9482	87	Storage 2MB
9483	87	Storage 2MB
9485	87	Storage 1MB
9486	87	Storage 1MB
9487	87	Storage 1MB
9522	09	Operator Panel (Models 51R, 52R, 53R, 61R, 62R, and 63R)
9541	21	AEA Cable Assembly
9621		Planar Board EIA/V35 0MB
9622		Planar X21 0MB
9623		Planar Board Model 63R

Removal/Replacement Procedures

This section provides the information needed to remove and replace logic cards, the power supply, the operator panel, diskette drives, fans, the AC line filter, and the planar board.

Feature Card Removal

1. Turn off AC power.
2. Remove the top cover.
3. Unlock and lift simultaneously the extractor levers at each end of the card until the card disengages. See Figure 3-4.

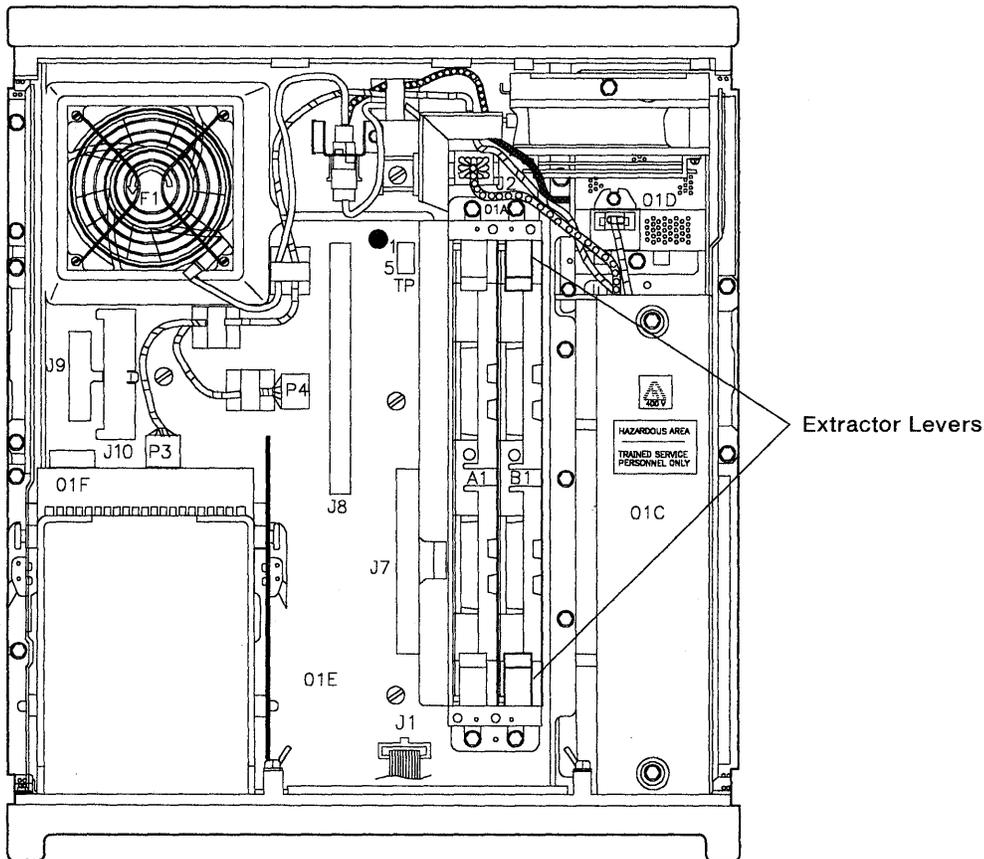


Figure 3-4. Feature Card Removal

Feature Card Replacement

1. Open both extractor levers fully. Insert the card into the card guides. See Figure 3-4. **Do not use the extractor levers to reseat the card.** Apply firm finger pressure to the back of the card to ensure proper contact seating.
2. Press firmly on the extractor levers and rotate them simultaneously until they are latched.

Storage Card Removal Models 61R, 62R, and 63R

The storage cards for Models 61R, 62R, and 63R must be installed in the locations as shown in the following table. Any other combinations will cause status errors.

Table 3-3. Storage Card Plugging for Models 61R, 62R, and 63R.		
Total Storage	Location	
	22	23
2MB	2MB	
3MB	2MB	1MB
4MB	2MB	2MB

1. Turn off AC power.
2. Remove the top cover.
3. Unscrew the two retaining screws at each end of the storage module and pull the module straight up until it disengages from the planar board. See Figure 3-5.
4. To replace, reverse the above procedure.

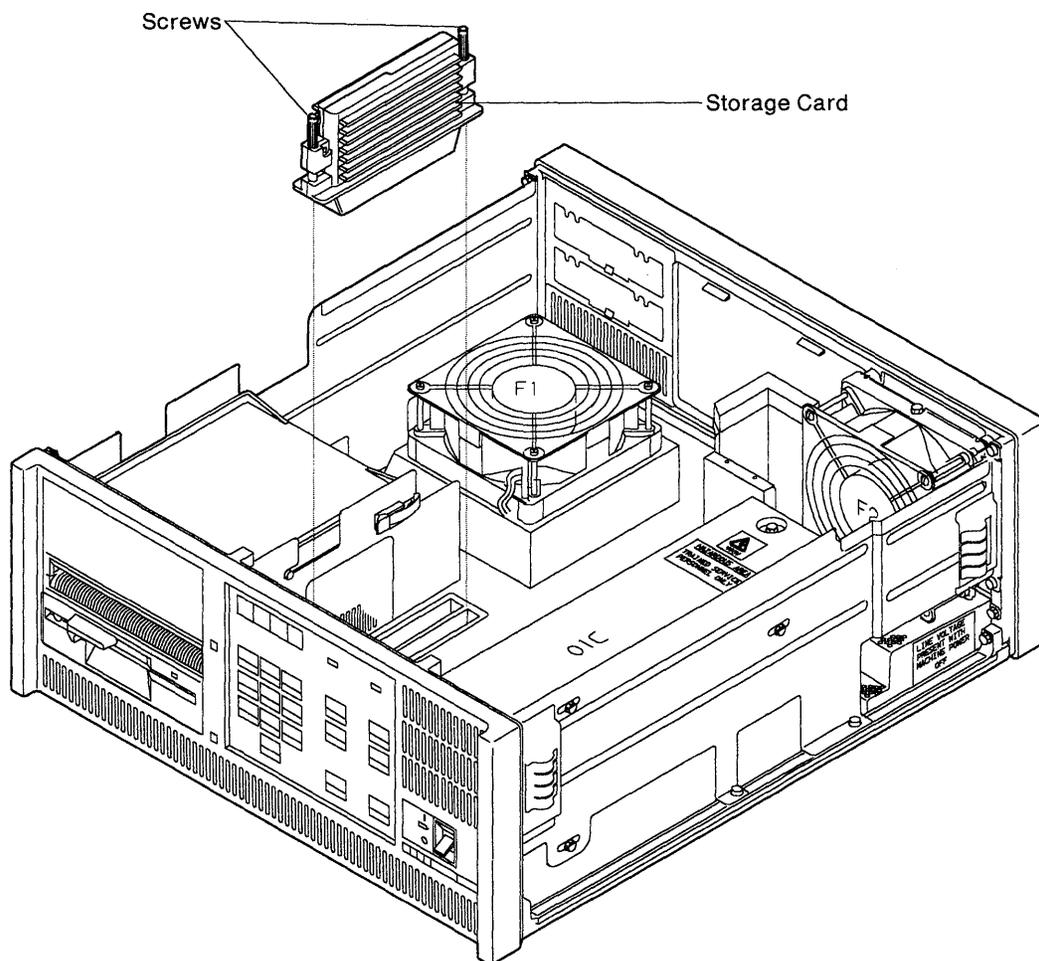


Figure 3-5. Storage Card Removal Models 61R, 62R, and 63R

Asynchronous Emulation Adapter I/O Panel and Cable Removal/Replacement

1. Turn off AC power.
2. Disconnect the power cord.
3. Remove the top cover.
4. Disconnect the I/O cable from the planar board.
5. Press down on the two holding clips at the top of the I/O panel until the top of the panel is free to swing outward.
6. Lift the I/O panel to release it from the two slots at the bottom.
7. Reverse the steps and actions to replace the I/O panel and cable.

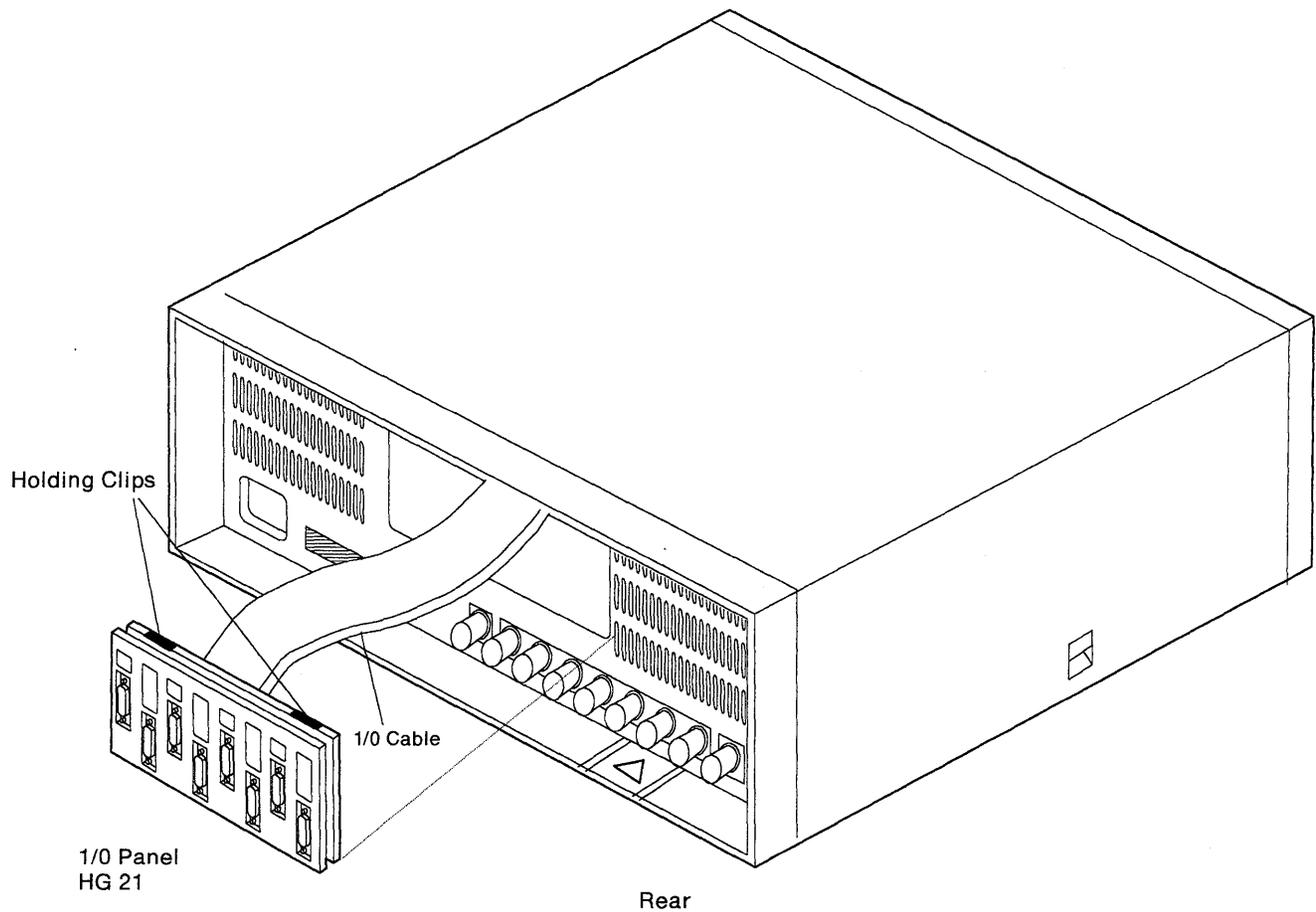


Figure 3-6. Asynchronous Emulation Adapter I/O Panel and Cable

Token-Ring Adapter Card Removal

1. Turn off AC power.
2. Disconnect the power cord.
3. Remove the top cover.
4. Remove the two hex head screws. See Figure 3-7.
5. Disconnect the cable from the adapter card.
6. Loosen the two slotted screws and remove the adapter card.
7. Reverse the steps and actions to replace the adapter card.

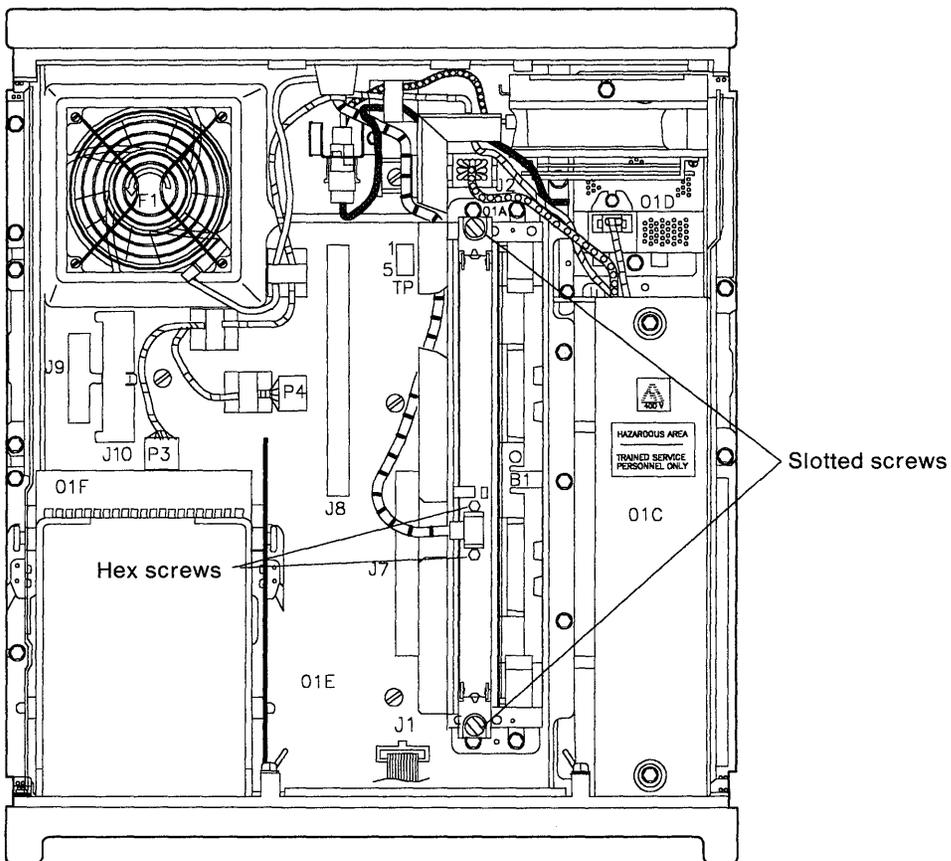


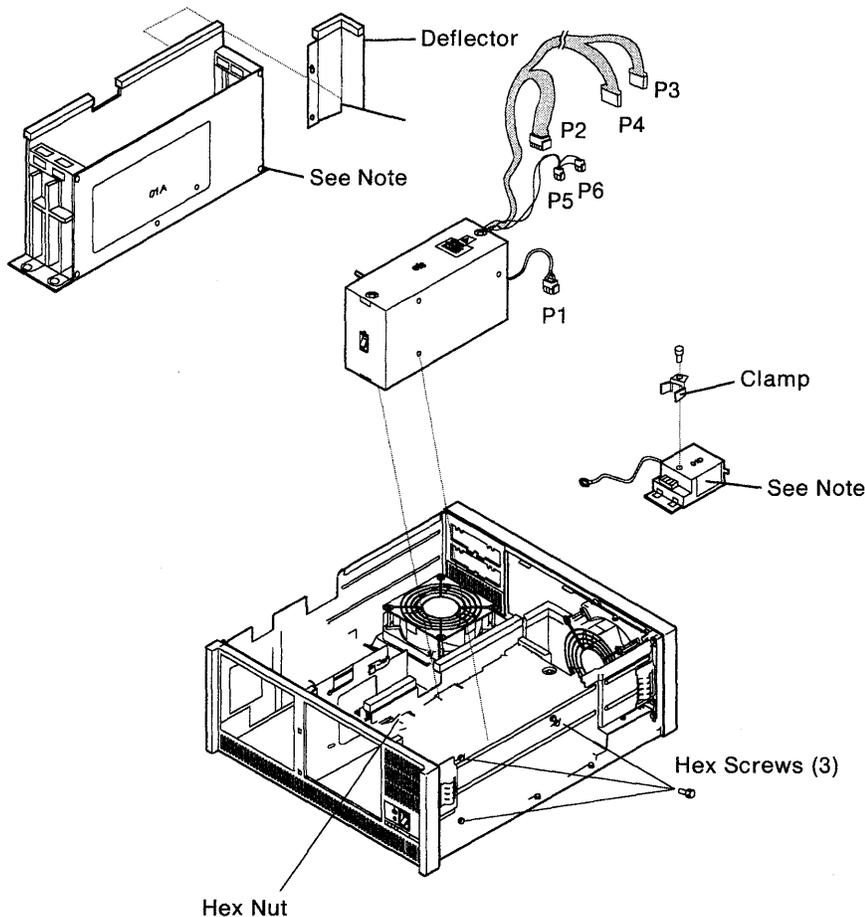
Figure 3-7. Token-Ring Adapter Card Removal

Power Supply Removal/Replacement

1. Turn off AC power.
2. Disconnect the power cord.
3. Remove the top cover.
4. Remove the three hex screws. See Figure 3-8 on page 3-10.
5. Loosen the hex nut.
6. Loosen the holding screw, and remove the deflector.
7. Disconnect the voltage connectors P2 through P6.
8. Loosen the holding screw, and remove the clamp. See Figure 3-8 on page 3-10.
9. Disconnect 01D – P1.
10. Slide the power supply back to remove it.

Warning: When replacing the power supply, guide the DC indicator LED *carefully* into the opening in the front panel of the controller. This is best accomplished by using the On/Off switch bezel as a finger hold and adjusting the LED into position with a finger just before final positioning of the power supply. Using a tool to force the LED into place can seriously damage the LED.

11. Reverse the steps and actions to replace the power supply.



Note: These parts are shown as removed for clarification only.

Figure 3-8. Power Supply Removal/Replacement

Operator Panel Removal/Replacement

1. Turn off AC power.
2. Remove the top cover.
3. Unplug cable 01C-P1.
4. Push in on the two locking tabs.
5. Push the top of the operator panel back and pull it out. See Figure 3-9.
6. Reverse the steps and actions to replace the operator panel.

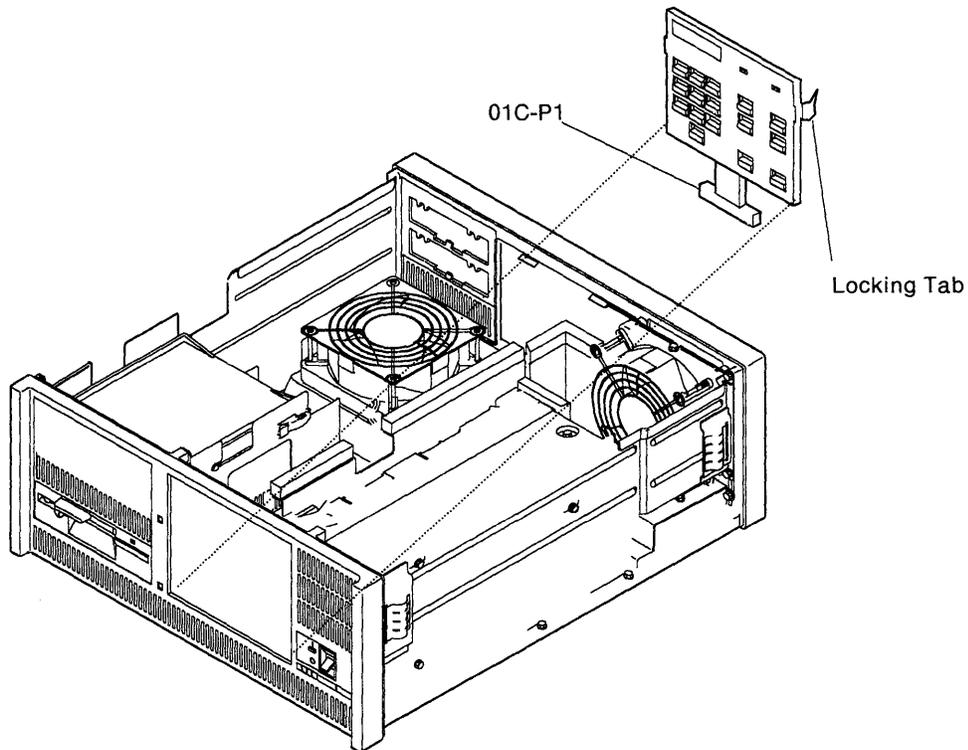


Figure 3-9. Operator Panel Removal/Replacement

Diskette Drive 2 Removal/Replacement

1. Turn off AC power.
2. Remove the top cover.
3. Disconnect signal cable SF2P1 and power connector P4.
4. Unlatch the locking tabs on each side of the diskette drive. See Figure 3-10.
5. Slide the diskette drive to the rear and lift it out.
6. Reverse the steps and actions to replace the diskette drive.

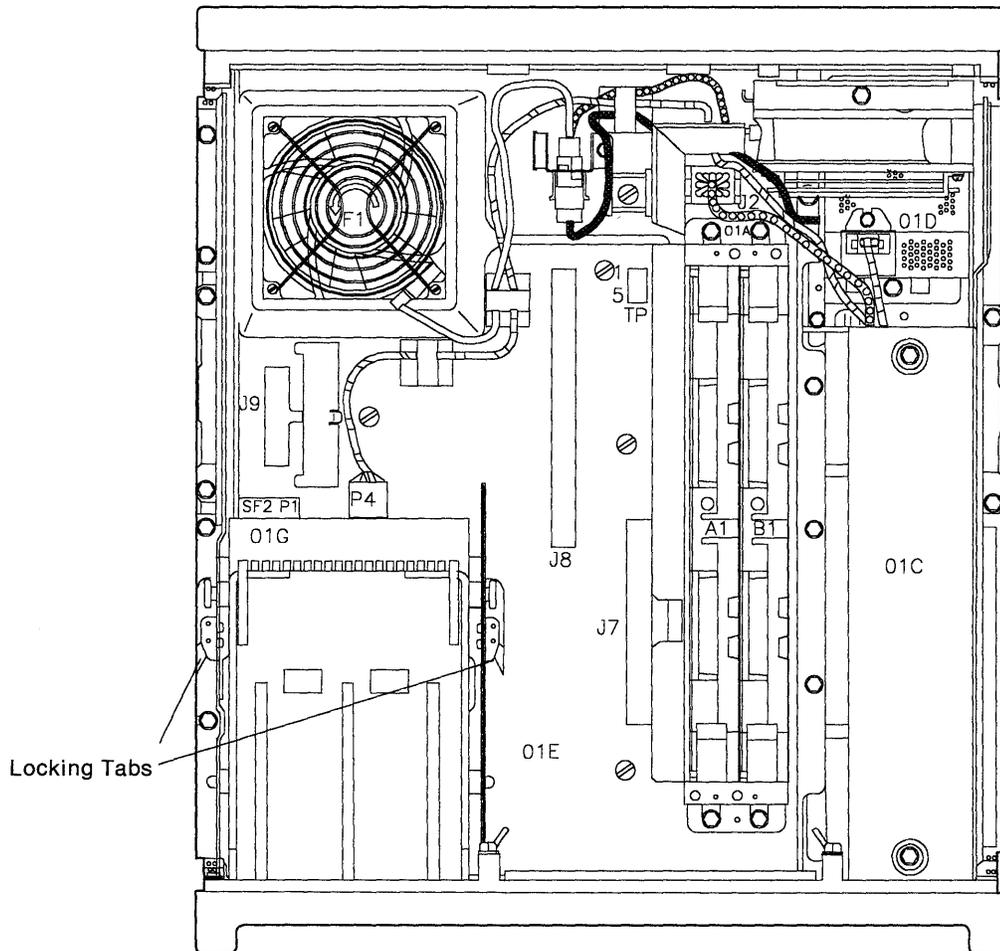


Figure 3-10. Diskette Drive 2 Removal

Diskette Drive 1 Removal/Replacement

1. Turn off AC power.
2. Remove the top cover.
3. Perform the removal procedure for diskette drive 2. See "Diskette Drive 2 Removal/Replacement" on page 3-12. If drive 2 is a fixed disk, see "Fixed Disk Removal/Replacement" on page 3-14. If neither optional drive is installed, remove the blank filler panel above diskette drive 1.
4. Remove the diskette storage compartment by pushing in on the side tabs and lifting it up.
5. Disconnect signal cable SF1P1 and power connector P4.
6. Models 61R through 63R: Remove the storage cards from locations 22 and 23.
7. Remove the four screws, two on each side of the diskette drive. See Figure 3-11.
8. Slide the diskette drive to the rear and lift it out.
9. If the replacement drive has four shoulder screws (two on each side), remove them. Reuse the screws that were removed from the machine in step 6.
10. Reverse the steps and actions to replace the diskette drive. Reuse the screws that were removed from the machine in step 6.

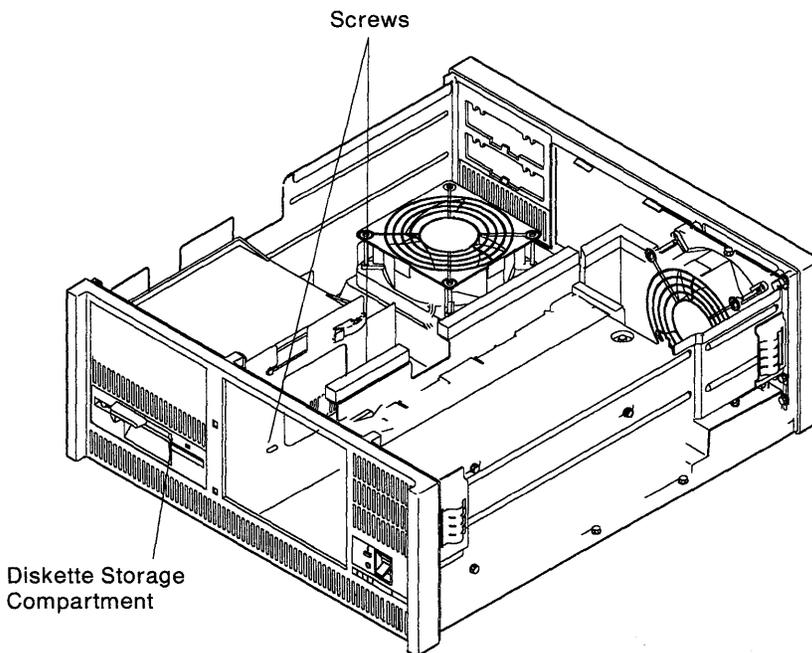


Figure 3-11. Diskette Drive 1 Removal

Fixed Disk Removal/Replacement

1. To prevent damage to the fixed disk and heads, perform an Alt 2 IML (if possible) to park the heads.
2. Place the power switch in the off position.
3. To remove the top cover.
 - a. Lift the latches on the sides of the top cover.
 - b. Pull the sides slightly outward and lift the cover off.
4. Disconnect the signal cable and power connector. Cables may be different that shown on some model.
5. Unlatch the locking tabs on each side of the fixed disk drive. See Figure 3-12.
6. Slide the fixed disk drive to the rear and lift it out.
7. Reverse the steps and actions to replace the fixed disk.
8. If you are replacing a defective disk drive, run "Fixed Disk Drive Full Format (FN 33)" on page 2-93.

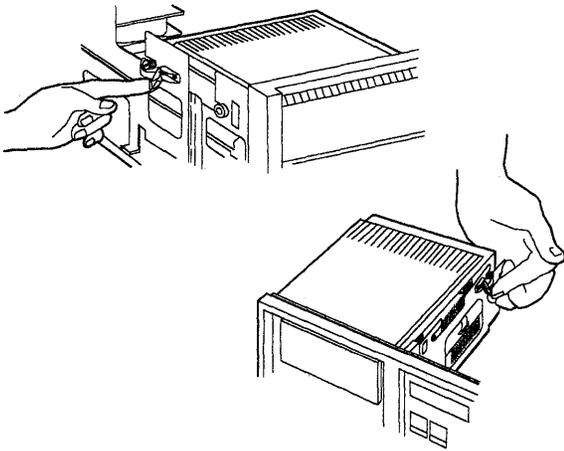


Figure 3-12 (Part 1 of 3). Fixed Disk Removal

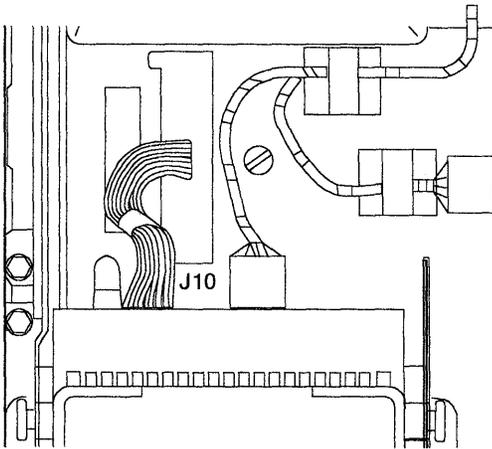


Figure 3-12 (Part 2 of 3). Fixed Disk Removal

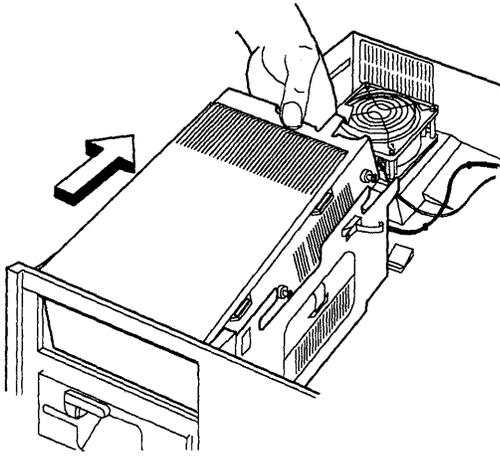


Figure 3-12 (Part 3 of 3). Fixed Disk Removal

Fan F1 Removal/Replacement

1. Turn off AC power.
2. Remove the top cover.
3. Disconnect the power connector. See Figure 3-13.
4. Remove the four mounting screws.
5. Reverse the steps and actions to replace the fan.

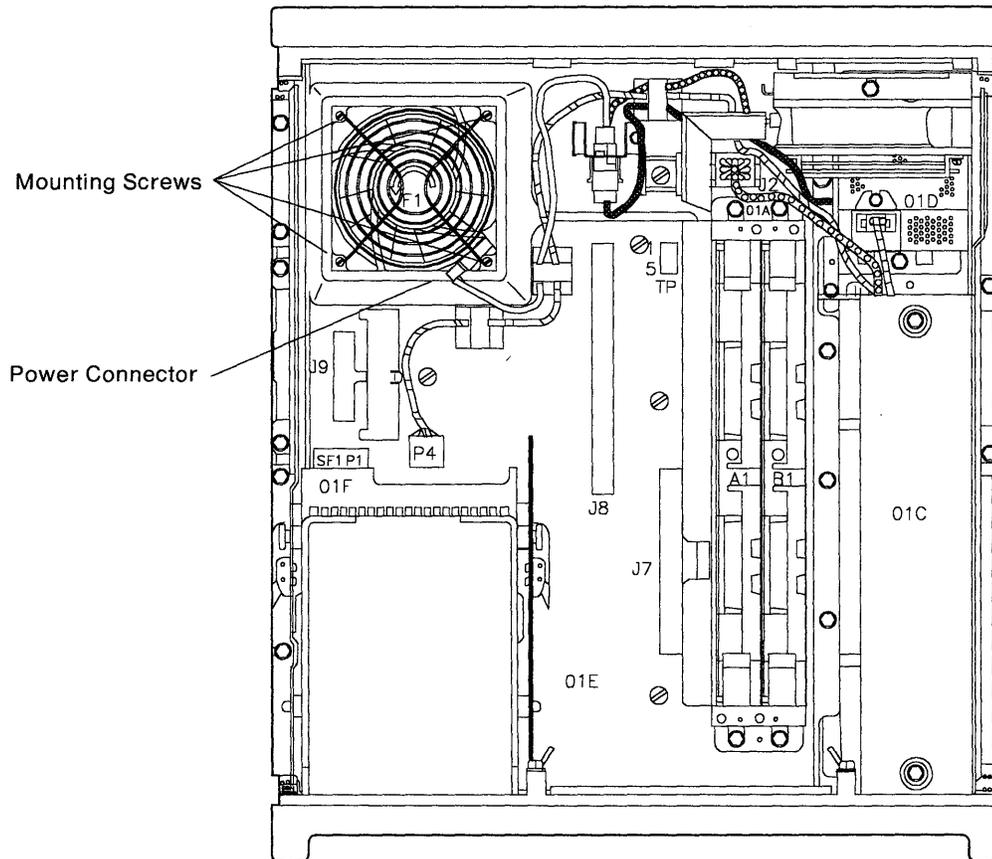


Figure 3-13. Fan F1 Removal

Fan F2 Removal/Replacement

1. Turn off AC power.
2. Remove the top cover.
3. Loosen the fan holding screw. See Figure 3-14.
4. Tilt the fan toward the power supply to lift it out.
5. Disconnect the power connector at the fan.
6. Reverse the steps and actions to replace the fan.

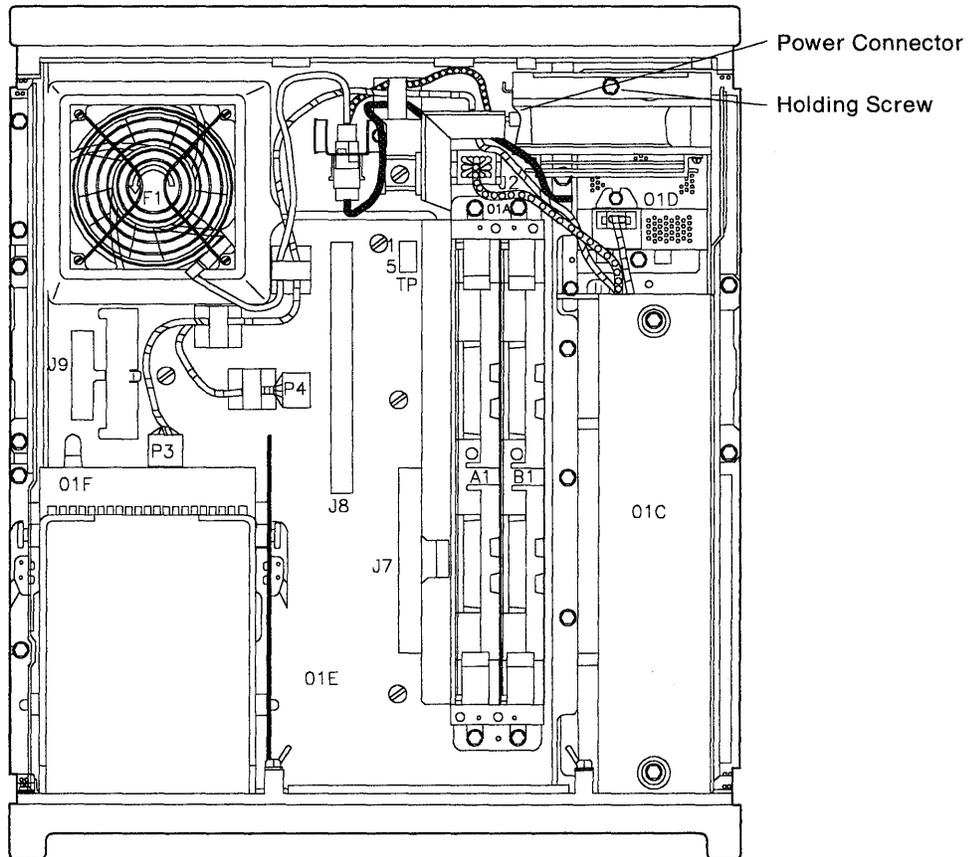


Figure 3-14. Fan F2 Removal

AC Line Filter Removal/Replacement

1. Turn off AC power.
2. Disconnect the power cord from the wall outlet and the rear of the controller.
3. Remove the top cover.
4. Loosen the plug 1 holding screw, and remove the clamp.
5. Disconnect plug P1. See Figure 3-15.
6. Remove fan F2. See "Fan F2 Removal/Replacement" on page 3-17.
7. Remove the two holding screws.
8. Remove the screw holding the yellow/green ground wire.

DANGER

You must connect the yellow/green wire to the frame of the controller before you reconnect the power cable. (For translations of this safety notice, see Safety Notice 9 in *IBM 3174 Safety Notices, GA27-3824.*)

9. Reverse the steps and actions to replace the AC line filter.

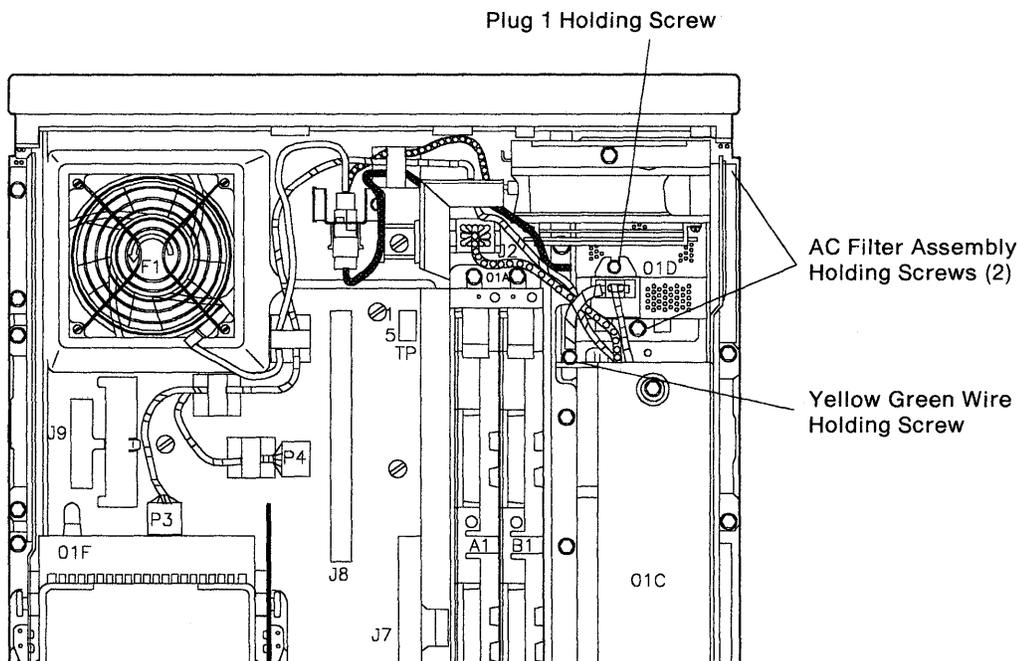


Figure 3-15. AC Line Filter Removal/Replacement

Planar Board Removal

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

1. Turn off AC power.
2. Disconnect the power cord.
3. Remove the top cover.
4. Label and disconnect the port signal cables and the communication interface cable from the rear of the controller.
5. Remove the logic card(s) if present. See "Feature Card Removal" on page 3-6.
6. On Models 61R through 63R, remove the storage cards in locations 22 and 23. See "Storage Card Removal Models 61R, 62R, and 63R" on page 3-7.
7. Loosen the holding screw, and remove the deflector. See Figure 3-16 on page 3-20.
8. Disconnect the following connectors:
 - P2 Power supply
 - P9 and P10 on Models 61R, 62R, and 63R.
 - P1 Operator panel connector plug P1.
9. Remove the two plastic covers by pushing on one end of the cover and lifting it up.
10. Remove the four slotted screws. (Only three are present on Models 61R through 63R). See Figure 3-16 on page 3-20.
11. Loosen the eight hex screws, four on each side. See Figure 3-16 on page 3-20.
12. Remove the plastic bezel by releasing four locking tabs at the top of the bezel with a screwdriver. See Figure 3-17 on page 3-21.
13. Lift up fan F1, and slide the planar board out.

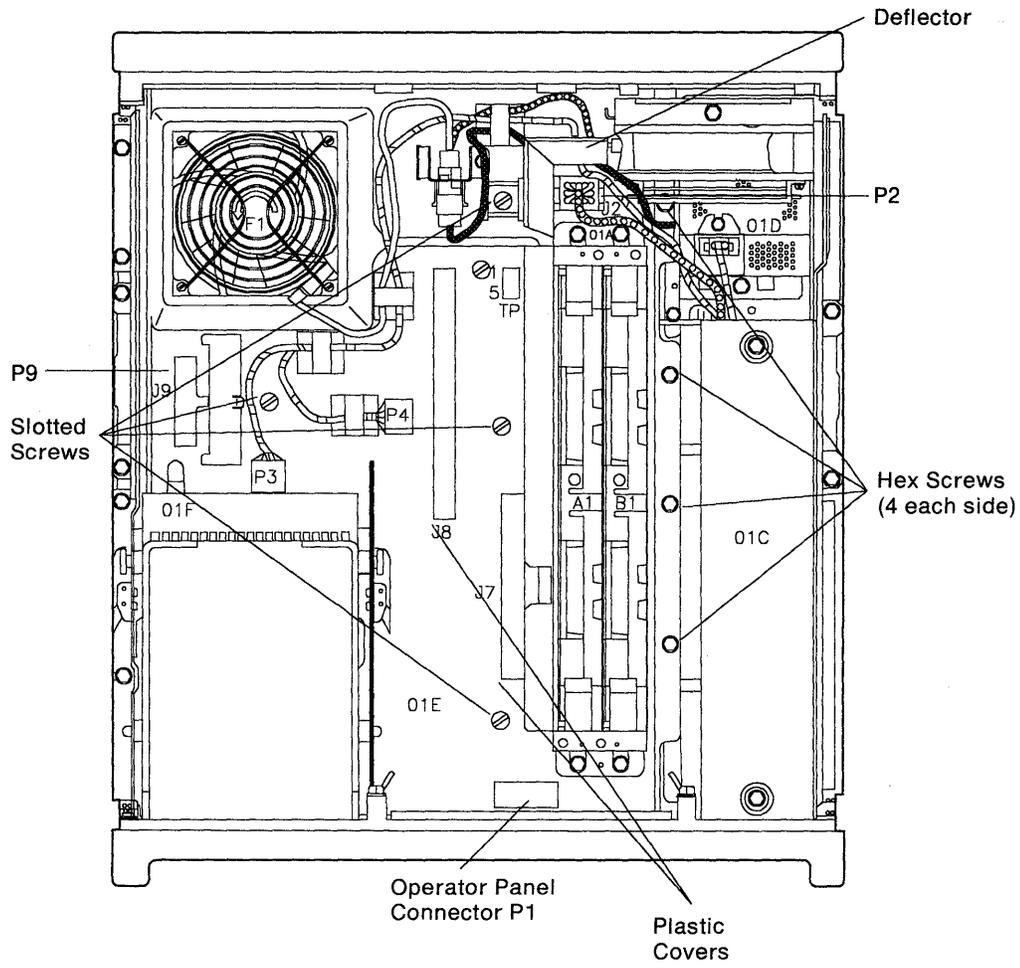


Figure 3-16. Planar Board Removal

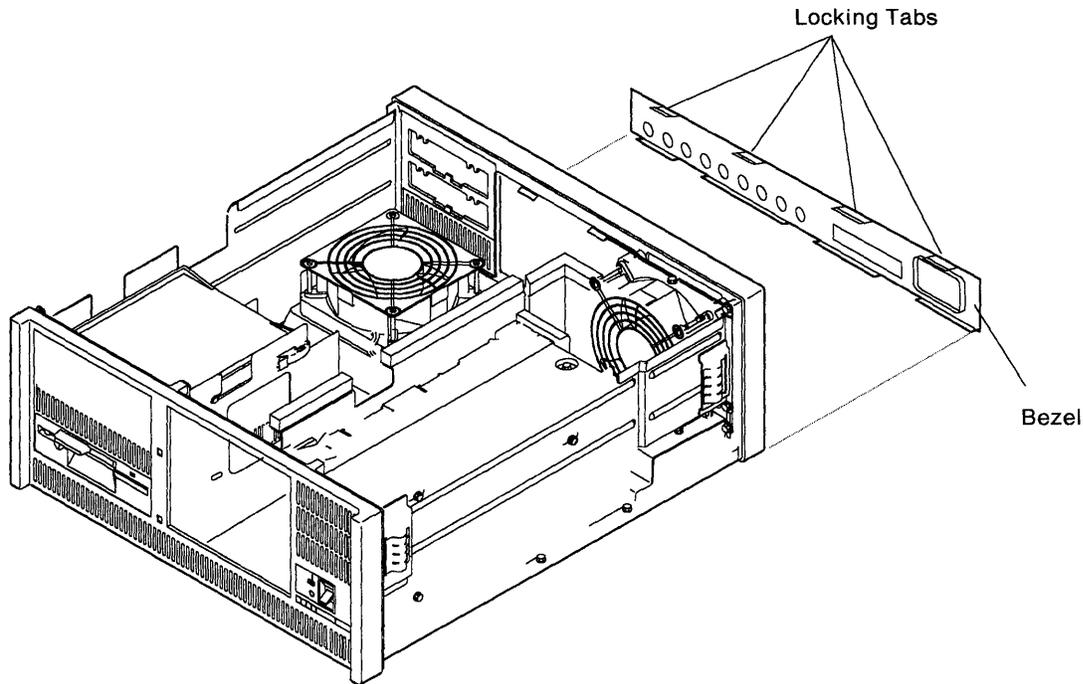


Figure 3-17. Planar Board Removal (Bezel Removed)

Planar Board Replacement

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

1. Lift up on fan F1, and slide the planar board in.
2. Line up the four standoffs on the planar with the four mounting holes in the metal cover. Models 61R, 62R, and 63R have only three screws. Seat the ring on top of the standoffs into each of the four mounting holes in the metal cover.
3. Replace the three slotted screws (four screws on Models 51R, 52R, and 53R). See Figure 3-16 on page 3-20.
4. Tighten the eight hex screws.
5. Reconnect the following connectors:
 - P2 Power supply
 - P9 and P10 on Models 61R, 62R, and 63R.
 - Operator panel connector 01C-P1 and P10 on Models 61R, 62R, and 63R
6. Install the two plastic covers.
7. Install the deflector and tighten the holding screw.
8. Install the logic cards if removed.
9. Install storage cards in locations 22 and 23.

repair information

10. Install the plastic bezel. See Figure 3-17.
11. Connect the port signal cables and the communication interface cable.
12. Connect the power cord.
13. Install the top cover.
14. Power on the controller and perform an Alt 2 IML to verify that it is working correctly. See "Alt 2 IML Procedures (Test 82)" on page 1-45.

Chapter 4. Safety Inspection Guide

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

Introduction

This chapter is a guide to inspecting 3174 Establishment Controller Models 51R, 52R, 53R, 61R, 62R, and 63R 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
 - The safety information in the front of this manual
 - *3174 Site Planning*, GA23-0213
 - *Electrical Safety for IBM Customer Engineers*, S229-8124.

Note: Although completeness and accuracy are the goals of this guide, not all machine configurations (for example, special features, RPQs) are covered. If you encounter a machine with RPQs or features not described in this guide, use the installation instructions for the RPQ or feature for additional information. Otherwise, use this guide and good judgment to obtain a safe machine.

General Checklist Guidelines

The intent of this inspection guide is to help you identify potentially unsafe conditions on machines being inspected. Each machine, at the time of its manufacture, had required safety items installed to protect the owners/operators and service personnel from injury. This checklist covers only those items. Good judgment should be used to identify potential safety conditions not covered by this inspection guide.

Perform the following checklist procedure before bringing power up on the machine. If any apparent unsafe conditions are present, a determination must be made on how serious the hazard could be and whether to continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical, especially primary power – for example, a frame with other than ground potential can cause a serious or fatal electrical shock.
- Explosive – for example, a damaged CRT face or bulging capacitors can result in serious injury.
- Use of chemicals, cleaning solutions, or solvents other than those specified by IBM.

Checklist

- Enter the machine serial number.

Check

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

Inside the Machine

- Check for any non-IBM alterations. If there are any, has “R009, Non-IBM Alteration/Attachment Survey” been completed?
- Check for broken or loose parts or assemblies. Check all retaining screws, such as those that secure the planar board to the frame housing and those that secure the power supply (see Figure 4-1).
- Check that the yellow/green ground wire on the AC line filter is connected to the machine frame. See Chapter 3.

Check for Machine Labels:

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

Power Plug Ground Check

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

Test Verification

Run either of the following tests:

- Test All 81 (CSU). See “Alt 1 IML Procedures” on page 1-42.
- Alt 2 IML. See “Alt 2 IML Procedures (Test 82)” on page 1-45.
- Investigate any failure before releasing the machine for customer use.

Safety Inspection Guide

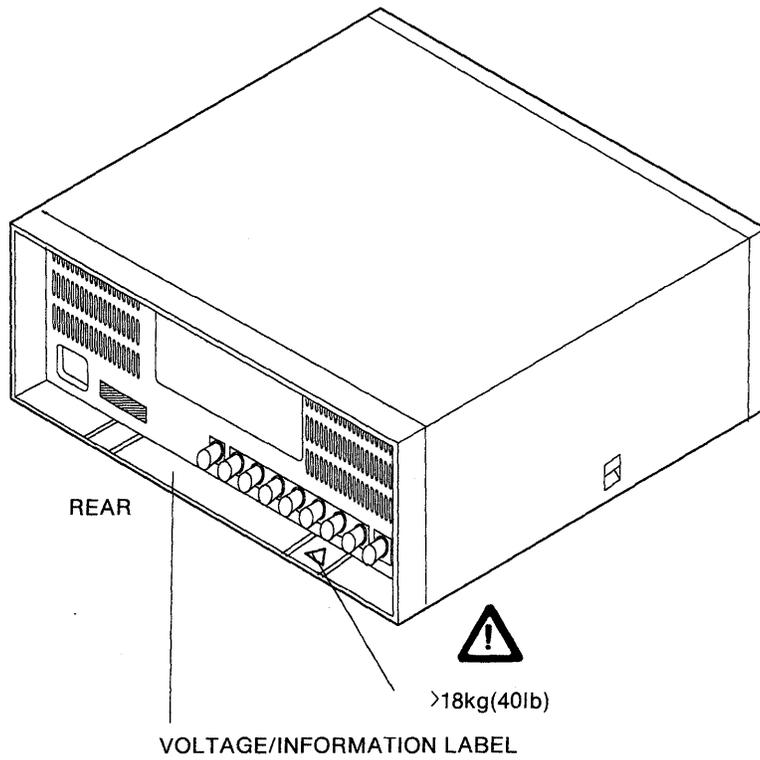
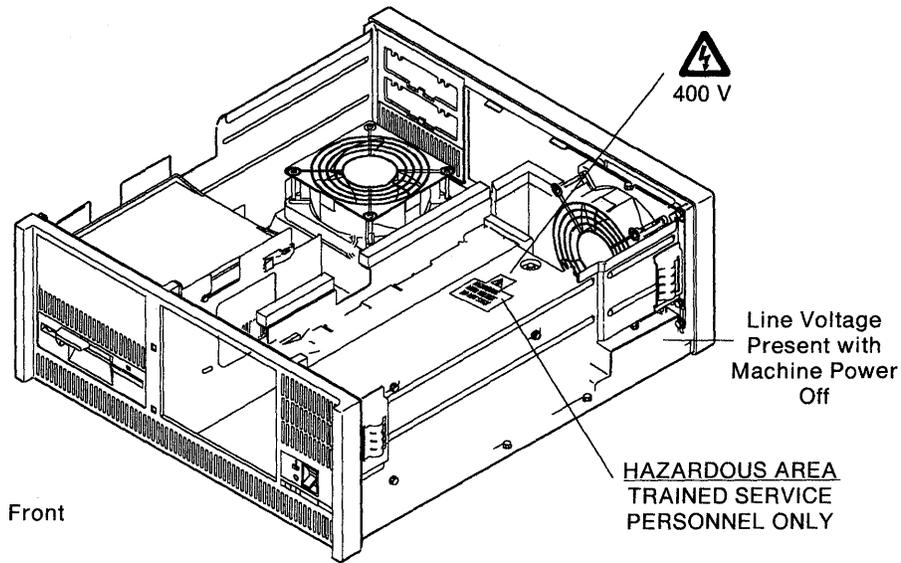


Figure 4-1. 3174 Safety Label Locations

Chapter 5. Parts Catalog

How To Use This Parts Catalog

• **SIMILAR ASSEMBLIES:** If two assemblies contain a majority of identical parts, they are broken down on the same list. Common parts are shown by one index number. Parts peculiar to one or the other of the assemblies are listed separately and identified by description.

• **AR:** (As Required) in the Units column indicates that the quantity is not the same for all machines.

• **NP:** (Non-Procurable) in the Units column indicates that the part is non-procurable and that the individual parts or the next higher assembly should be ordered.

• **NR:** (Not Recommended) in the Units column indicates that the part is procurable but not recommended for field replacement, and that the next higher assembly should be ordered.

• **R:** (Restricted) in the Units column indicates that the part has a restricted availability.

• **INDENTURE:** The indenture is marked by a series of dots located before the parts description. The indenture indicates the relationship of a part to the next higher assembly. For example:

Indenture	Relationship of Parts
(No dot)	MAIN ASSEMBLY
(One dot)	• Detail parts of a main assembly
(One dot)	• Subassembly of the main assembly
(Two dot)	• • Detail part of a one-dot subassembly
(Two dot)	• • Subassembly of a one-dot subassembly
(Three dot)	• • • Detail part of a two-dot subassembly

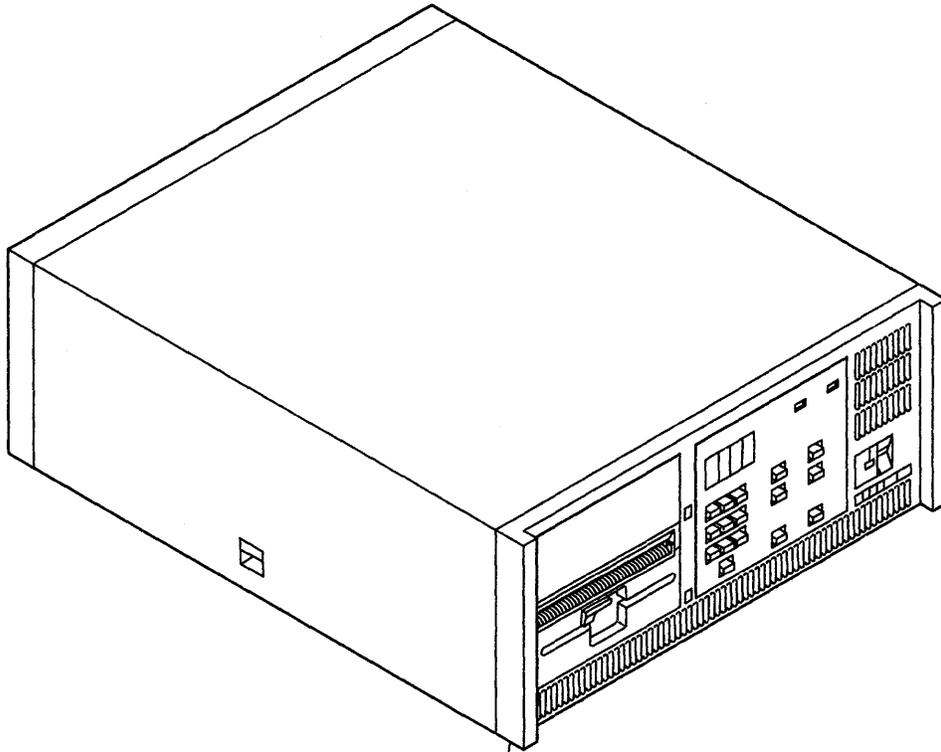
Assembly *n*: EXAMPLE ASSEMBLY

Asm – Index	Part Number	Units	Description
<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 5-20
Final Assembly- 3174 Models 51R,52R,53R,61R,62R, and 63R 5-6

Visual Index I.Final Assembly- 3174 Models 51R,52R,53R,61R,62R and 63R

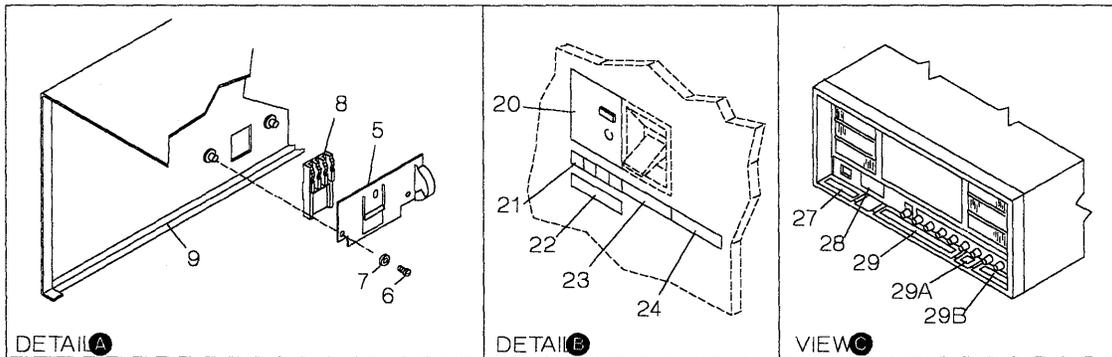
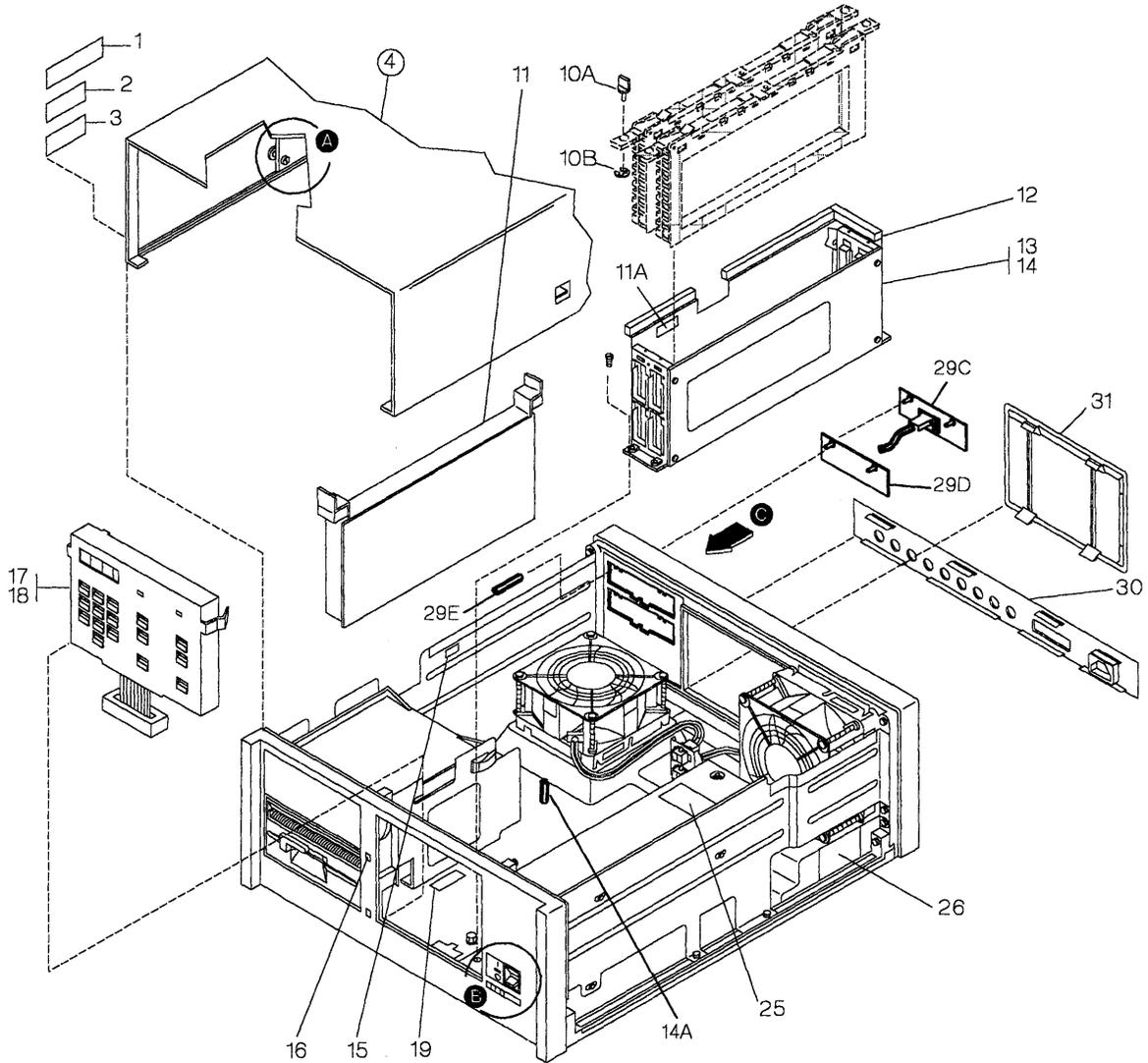


Final Assembly-
3174 Models 51R, 52R, and 53R
Assembly 1
Page 5-6

Cable Assemblies With
Component Parts
Assembly 2
Page 5-20

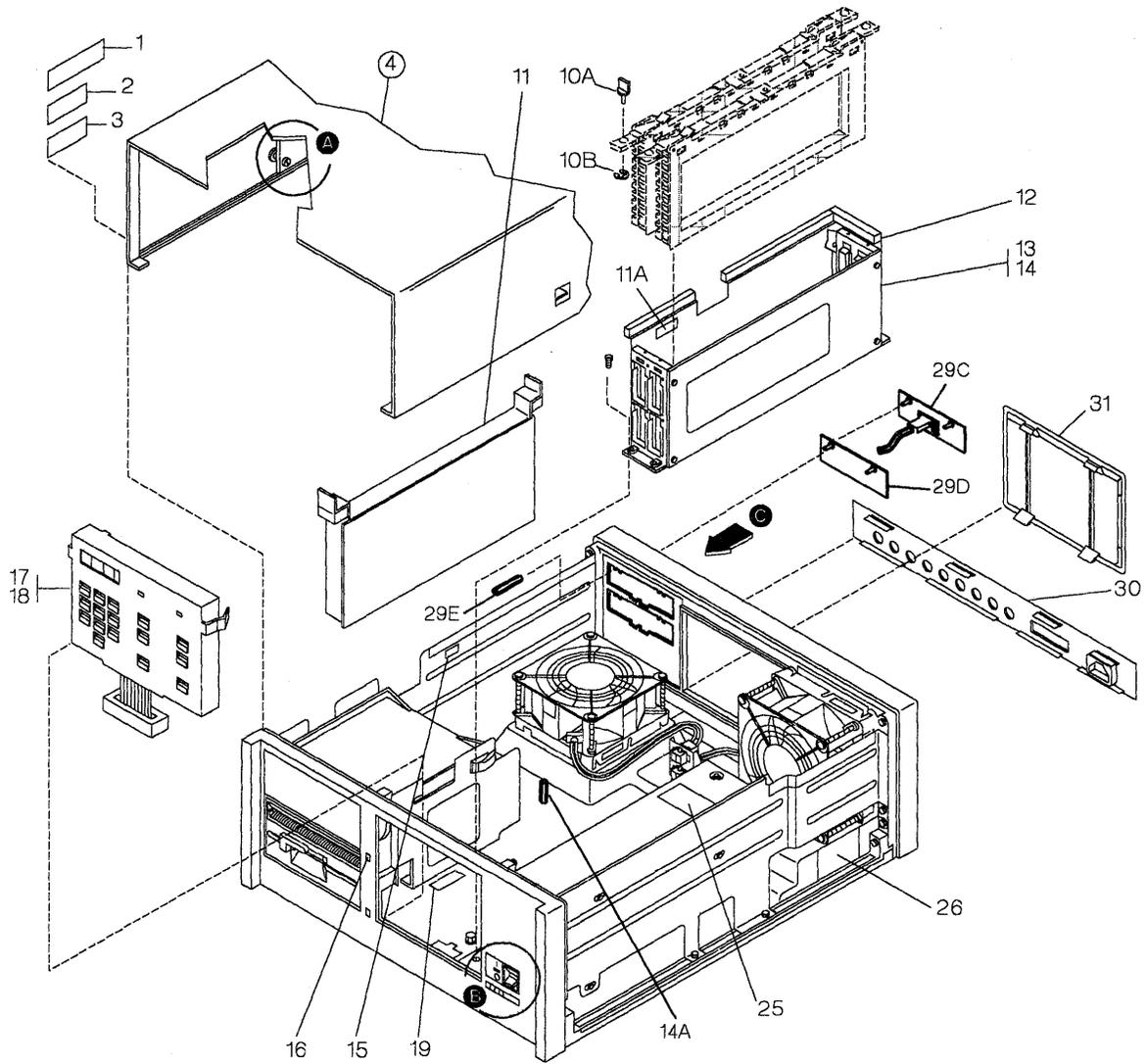
Catalog Section

Assembly 1: Final Assembly- 3174 Models 51R,52R,53R,61R,62R, and 63R



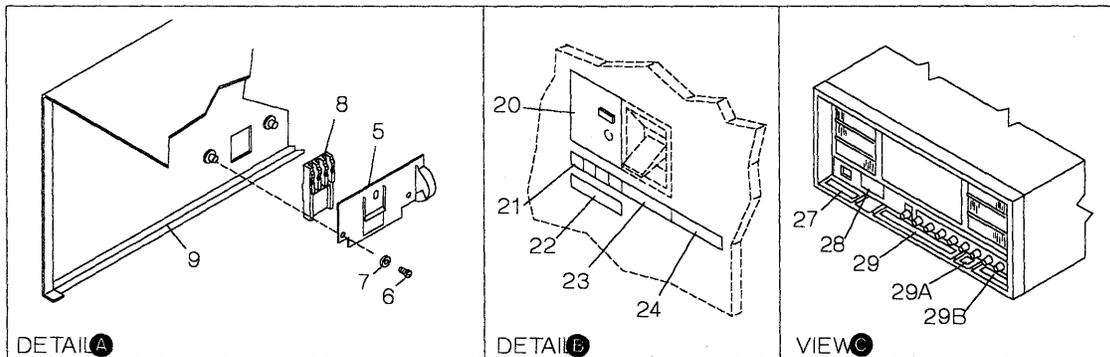
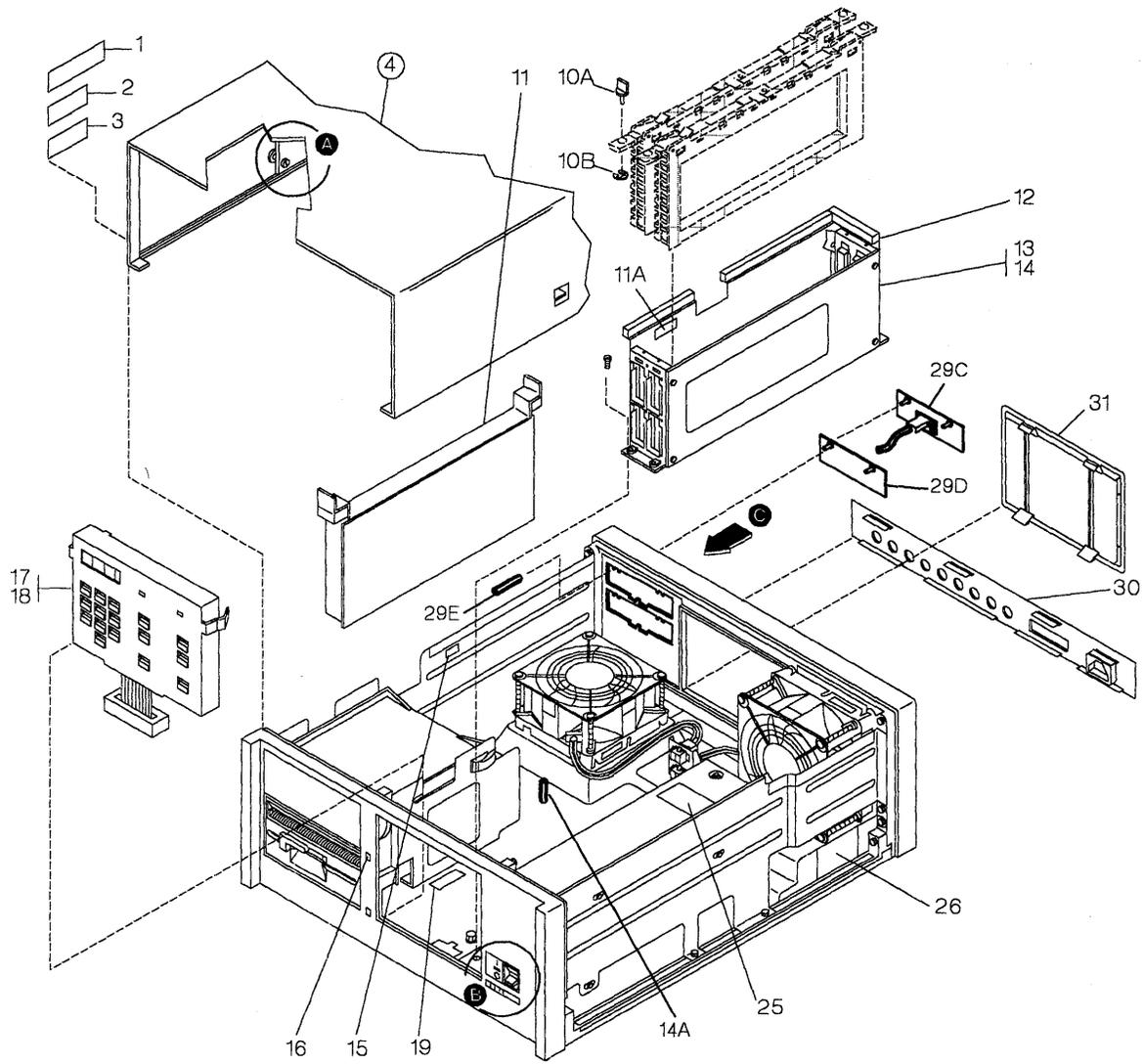
Asm – Index	Part Number	Units	Description
1 –		NP	Final Assembly- 3174
– 1	5953429	1	• Label,PTT-Australia
– 2	855285	1	• Plate,Export
– 3	855284	1	• Plate,Mfg Export-Used On Units Shipped From The Netherlands
– 4	6423110	1	• Cover Assembly
– 5	6423052	2	• • Spring,Retainer Cover
– 6	1621190	4	• • Screw,Pan HD-M4 X 8 Long
– 7	1622334	4	• • Washer,Lock Int T- 4.3 ID X 8 OD
– 8	6423051	2	• • Retainer-Latch Cover
– 9	6423018	1	• • Cover
– 10A	6128621	2	• Thumbscrew
– 10B	5267973	2	• Clip,Retaining
– 11	61X4653	AR	• Cassette,Blank
– 11A	811825	1	• Label,Write-In
– 12	6168470	1	• Baffle,CBM
– 13	6423430	1	• Guide Assembly
– 14	1621811	4	• Screw,Thd Form Hex Wshr HD-M4 X 10 Long
– 14A	25F8330	1	• Thumbnut
– 15	56X4700	1	• Label,S/N
– 16	6423424	1	• Label,File ID
– 17	6423437	1	• Overlay,Ops Panel-Brazil/Port
– 17	6423438	1	• Overlay,Ops Panel-English
– 17	6423439	1	• Overlay,Ops Panel-French
– 17	6423440	1	• Overlay,Ops Panel-German
– 17	6423441	1	• Overlay,Ops Panel-Italian
– 17	6423442	1	• Overlay,Ops Panel-Japanese
– 17	6423443	1	• Overlay,Ops Panel-Spanish Note: Order Ops Panel Overlays Separate By Countries
– 18	6423107	1	• Operator Panel Assembly
– 19	66X2412	1	• Label,Fru-Models 51R and 61R
– 19	66X2413	1	• Label,Fru-Models 52R and 62R
– 20	6423056	1	• Overlay,Power
– 20	6423112	1	• Overlay,Power-Japanese
– 21	6168584	1	• Label,Hexadecimal
– 22	1359009	1	• Plate,Export-Netherlands
– 23	6168585	1	• Label,S/N
– 24	6423131	1	• Nameplate-Model 51R
– 24	6423132	1	• Nameplate-Model 52R
– 24	6423133	1	• Nameplate-Model 53R
– 24	25F8367	1	• Nameplate-Model 61R
– 24	25F8368	1	• Nameplate-Model 62R
– 24	25F8369	1	• Nameplate-Model 63R

Assembly 1: (continued)



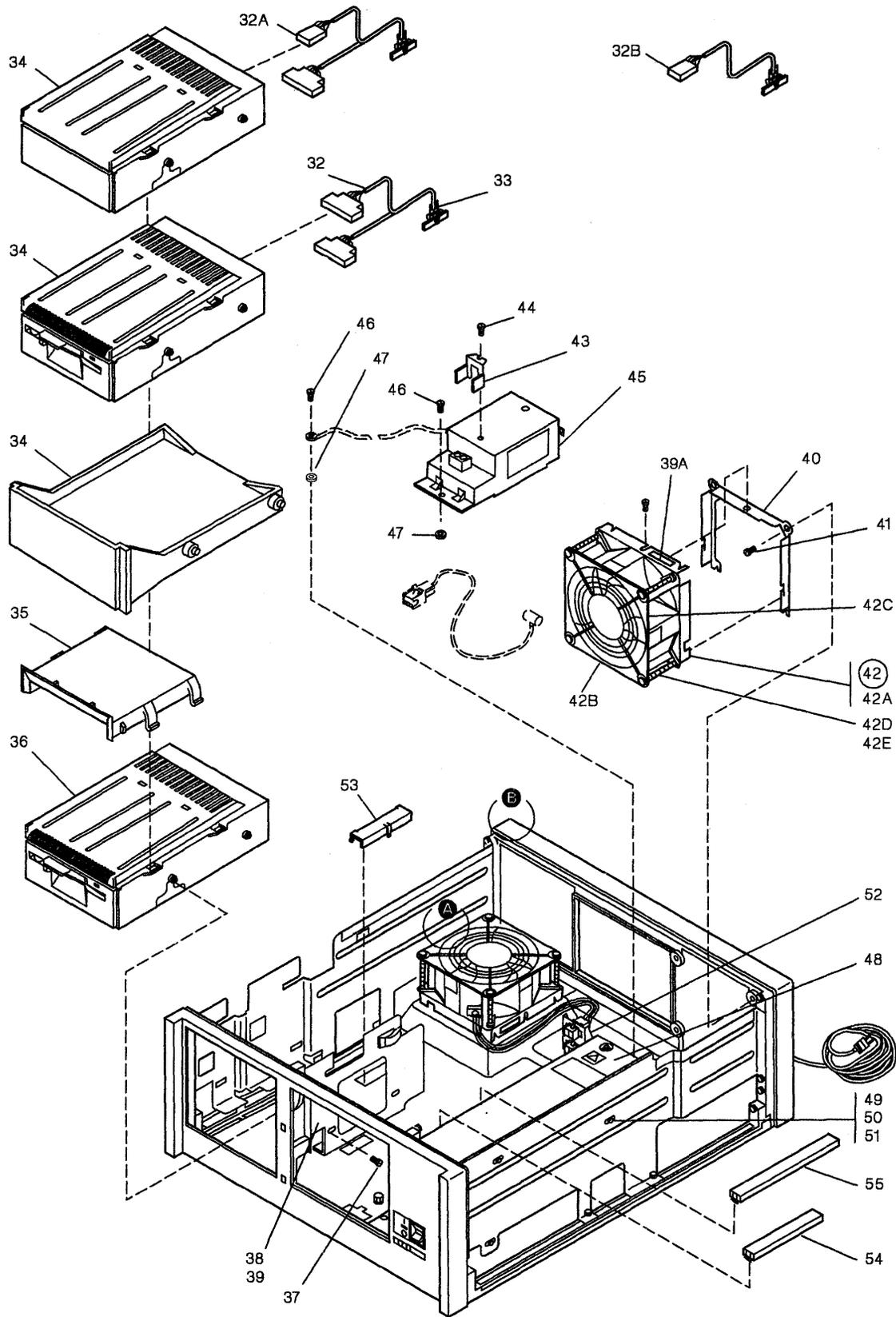
Asm – Index	Part Number	Units	Description
1 – 25	5685244	1	• Label,Hazard Area-Belgium
– 25	6815183	1	• Label,Hazard Area-Portuguese
– 25	2677406	1	• Label,Hazard Area-Danish
– 25	5685244	1	• Label,Hazard Area-Dutch
– 25	5718466	1	• Label,Hazard Area-English/USA
– 25	8326801	1	• Label,Hazard Area-Finnish
– 25	8326797	1	• Label,Hazard Area-Japanese
– 25	4423212	1	• Label,Hazard Area-Norwegian
– 25	8551904	1	• Label,Hazard Area-Swedish
– 25	1743548	1	• Label,Hazard Area-Canada/French
– 25	1743549	1	• Label,Hazard Area-French,German,Italian, Spanish,Swiss, and English/UK Note: Order Label Separate By Countries
– 26	4420467	1	• Label,Line Voltage-Belgium
– 26	6815188	1	• Label,Line Voltage-Portuguese
– 26	401534	1	• Label,Line Voltage-Danish
– 26	401530	1	• Label,Line Voltage-Dutch
– 26	138754	1	• Label,Line Voltage-English/USA, Canada, and English/UK
– 26	6825818	1	• Label,Line Voltage-Finnish
– 26	6812830	1	• Label,Line Voltage-Italian/Swiss
– 26	6825840	1	• Label,Line Voltage-Japanese
– 26	4418722	1	• Label,Line Voltage-Norwegian
– 26	6812829	1	• Label,Line Voltage-Spanish
– 26	8551903	1	• Label,Line Voltage-Swedish
– 26	6812831	1	• Label,Line Voltage-Canadian/French
– 26	4494962	1	• Label,Line Voltage-French,German, and Swiss-Order Label Separate By Countries
– 27	83X9764	1	• Label,PTT-German
– 27	83X9765	1	• Label,Swedish
– 28	5627920	1	• Label,Use Only Cable-Belgium,Danish, Dutch,English/USA,Finnish,Norwegian, Swedish,Swiss,English/UK
– 28	5267926	1	• Label,Use Only Cable-Portuguese
– 28	5267922	1	• Label,Use Only Cable-French
– 28	5267923	1	• Label,Use Only Cable-German
– 28	5267925	1	• Label,Use Only Cable-Italian
– 28	5267927	1	• Label,Use Only Cable-Japanese
– 28	5267924	1	• Label,Use Only Cable-Spanish
– 28	5267921	1	• Label,Use Only Cable-Canada/French
– 28	83X9934	1	• Label,Blank

Assembly 1: (continued)



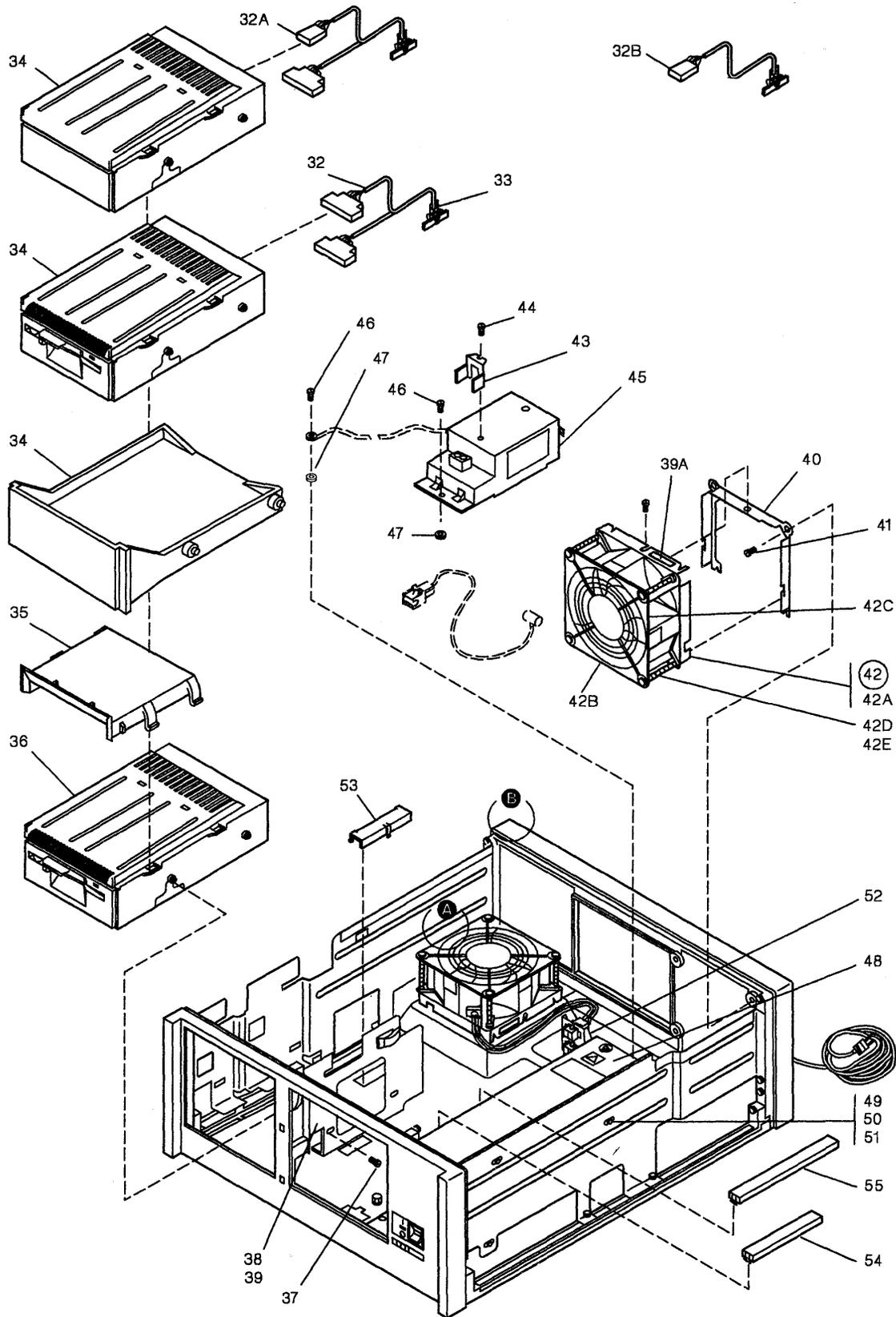
Asm – Index	Part Number	Units	Description
1 – 29	6168378	1	• Plate,Info, 100V-USA/Canadian
– 29	6168592	1	• Plate,Info, 100V-AFE(SA)
– 29	6168593	1	• Plate,Info, 200V-AFE(SA)
– 29	6168379	1	• Plate,Info, 100V-EMEA
– 29	6168380	1	• Plate,Info, 200V-EMEA
– 29	6168594	1	• Plate,Info, 100V-AFE (Far East)
– 29	6168595	1	• Plate,Info, 200V-AFE (Far East)
– 29A	6168596	1	• Label,Safety-Weight
– 29B	73X3979	1	• Label,Used On Units Shipped To UK
– 29C	25F8378	AR	• I/O Panel Adapter-Token Ring Models 61R, 62R and 63R Only
– 29C	25F8472	1	• I/O Panel Concurrent Communication Adapter Models 61R,62R and 63R Only
– 29D	25F8371	AR	• Panel,Blank
– 29E	25F8429	4	• Nut,Thumb
– 30	6423120	1	• Bezel,BNC
– 31	25F8371	1	• Bezel,Blank-Models 51R,52R and 53R
– 31	6423116	1	• Bezel,Blank-Models 61R,62R and 63R
– 31	6423233	1	• I/O Panel,Asynchronous Emulation(DOM)- Models 51R,52R and 53R
– 31	6423144	1	• I/O Panel,Asynchronous Emulation(WT)- Models 51R,52R and 53R
– 31	39F7834	1	• I/O Panel,Asynchronous Emulation(DOM)- Models 61R,62R and 63R
– 31	39F7831	1	• I/O Panel,Asynchronous Emulation(WT)- Models 61R,62R and 63R

Assembly 1: (continued)



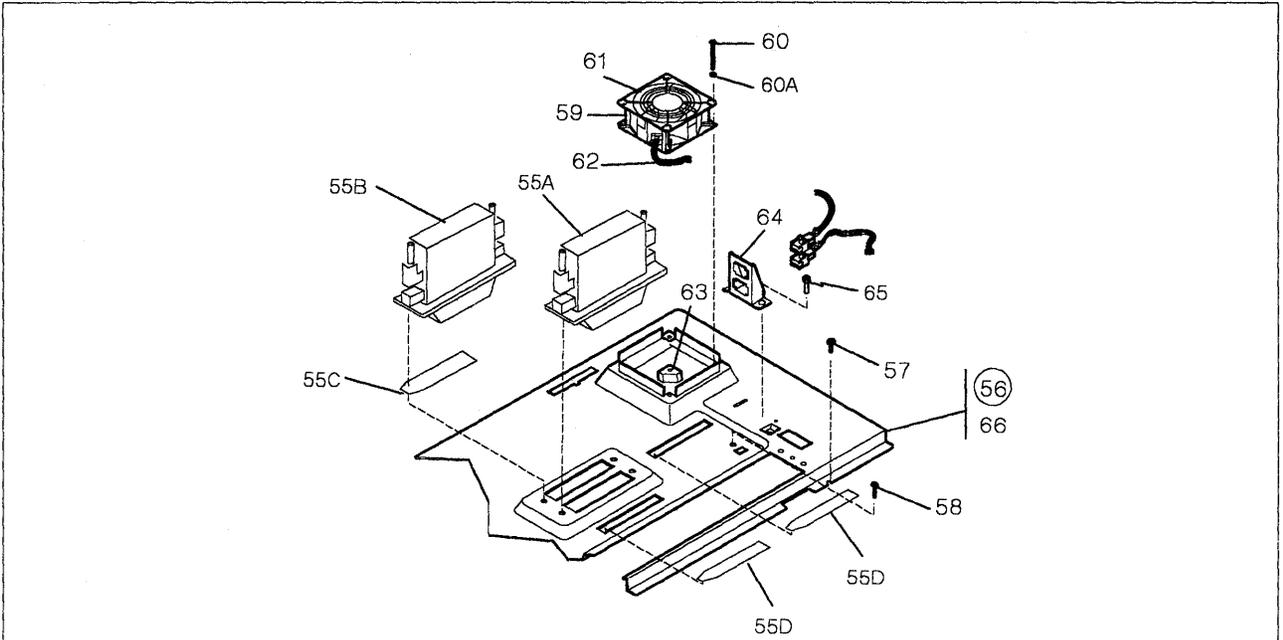
Asm – Index	Part Number	Units	Description
1 – 32	25F7456	1	• Diskette Drive Cable Asm. 2.4 Meg Base/2.4 Meg Feature Models 61R,62R and 63R
– 32	39F7906	1	• Diskette Drive Cable Asm. 2.4 Meg Base/1.2 Meg Feature Models 61R,62R and 63R
– 32	39F7835	1	• Diskette Drive Cable Asm. 1.2 Meg Base/2.4 Meg Feature Models 51R,52R and 53R
– 32	6423149	1	• Diskette Drive Cable Asm. 1.2 Meg Base/1.2 Meg Feature Models 51R,52R and 53R
– 32A	25F7457	1	• Diskette/Fixed Disk Drive Cable Asm. 2.4 Meg Diskette/20 Meg Fixed Disk Models 61R,62R and 63R
– 32B	6423150	1	• Fixed Disk Drive Cable Asm. Models 51R,52R and 53R
– 33	2596293	1	• Clip,Cable
– 34	8575392	1	• Fixed Disk Asm-Models 51R,52R and 53R
– 34	25F8366	1	• Fixed Disk Asm-Models 61R,62R and 63R
– 34	6168468	1	• Diskette Asm,Drive 2 (Feature) 1.2 Meg
– 34	25F8399	1	• Diskette Asm,Drive 2 (Feature) 2.4 Meg
– 34	6423115	1	• Bezel,Blank Used When Diskette or Hard Disk Asm Is Not Installed in Drive 2.
– 35	6423136	1	• Holder,Diskette Pocket
– 36	6168468	1	• Diskette Asm,Drive 1 (Base) 1.2 Meg Models 51R,52R and 53R
– 36	25F8399	1	• Diskette Asm,Drive 1 (Base) 2.4 Meg Models 61R,62R and 63R
– 37	4796653	4	• Screw,Metric-Hex Wshr HD-M4 X 6 Long
– 38	6423139	1	• Bracket,File Mtg
– 39	7362385	2	• Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 39A	811825	1	• Label,Write-On
– 40	6423427	1	• Bracket,Fan Mtg
– 41	7362385	5	• Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 42	6423429	1	• Fan Assembly-Models 51R,52R and 53R
– 42	25F8428	1	• Fan Assembly-Models 61R,62R and 63R
– 42A	6423428	1	• • Adapter,Fan
– 42B	6168801	1	• • Guard,Fan
– 42C	25F7207	1	• • Fan
– 42D	1621155	4	• • Screw,Pan HD-M3 X 40 Long
– 42E	1622302	4	• • Washer,Flat- 3.2 ID X 7 OD X .5 Thk

Assembly 1: (continued)

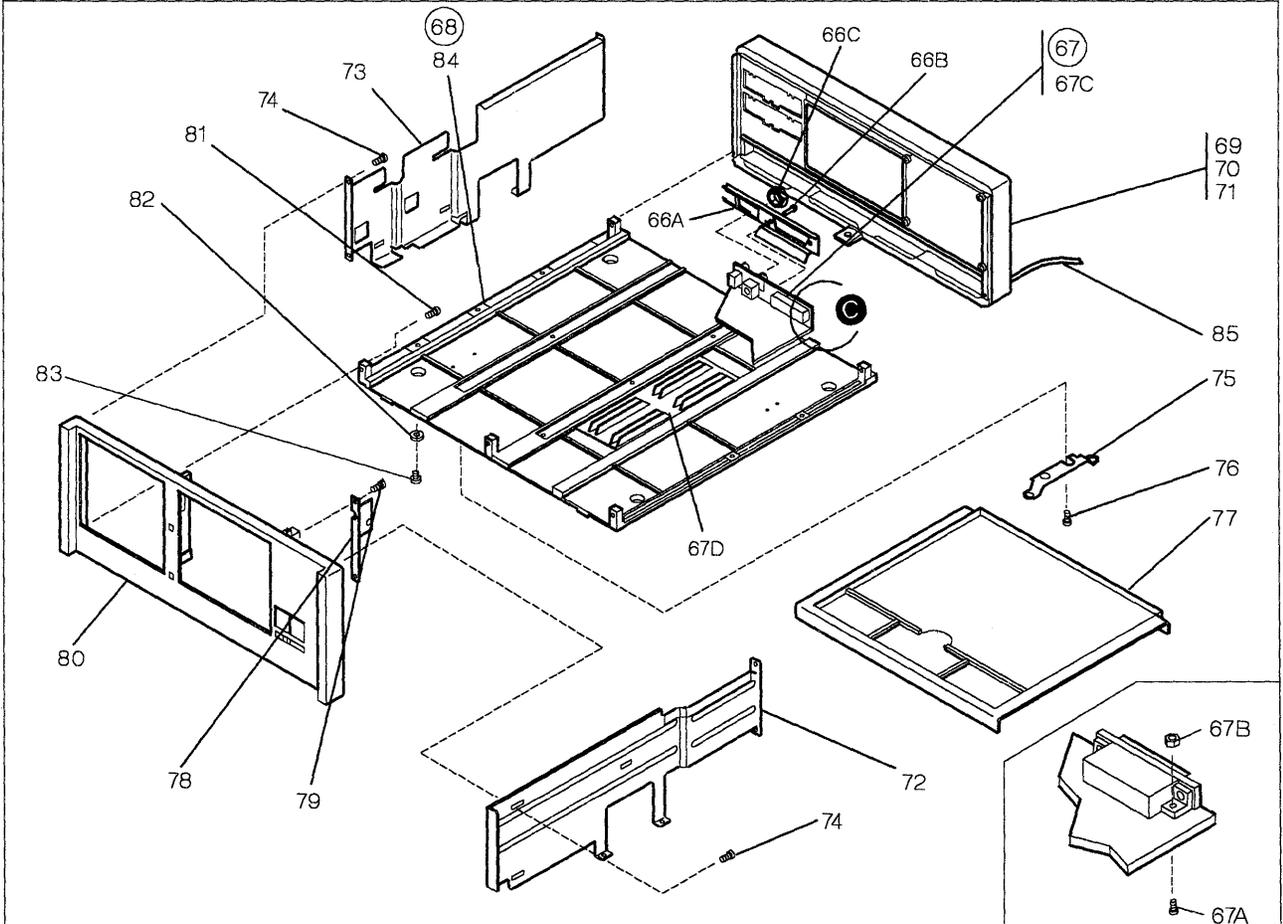


Asm – Index	Part Number	Units	Description
1 – 43	6423094	1	• Bracket, Keeper
– 44	1621832	1	• Screw, Thd Form Hex Wshr HD-M4 X 5 Long
– 45	01F3344	1	• EMC Filter Assembly Note: Order Label Separate By Countries, (See Index 1-26)
– 46	7362385	3	• Screw, Thd Form Hex Wshr-M4 X .7 X 8 Long
– 47	1622346	2	• Washer, Lock Star- 4.3 ID X 8 OD X .5T
– 48	25F8391	1	• DC Power Assembly, LV 100V, 50/60 Hz
– 48	25F8392	1	• DC Power Assembly, HV 200V, 50/60 Hz Note-Order Label Separate By Countries, (See Index 1-25)
– 49	1621832	3	• Screw, Thd Form Hex Wshr HD-M4 X 5 Long
– 50	1622346	1	• Washer, Lock Star- 4.3 ID X 8 OD X .5T
– 51	1622403	1	• Nut, Hex-M4 X 7 Fl W X 3.2 Thk
– 52	2596291	3	• Clip, Cable
– 53	6168382	1	• Clip, Plug Snap-In, Used When Diskette Assembly is Not Installed
– 54	6168383	1	• Clip, Plug Snap-In
– 55	6168381	1	• Clip, Plug Snap-In

Assembly 1: (continued)



DETAIL **A**



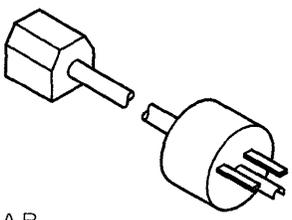
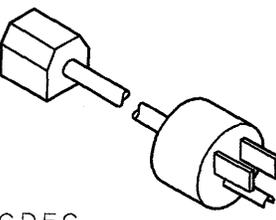
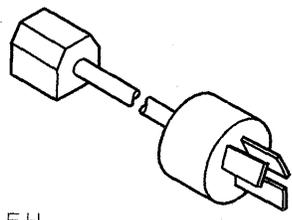
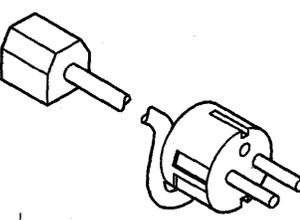
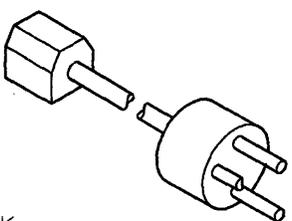
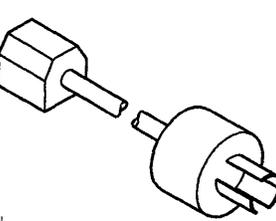
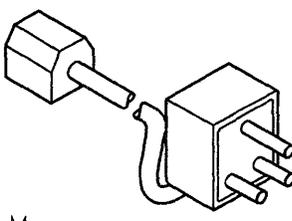
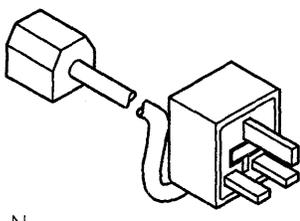
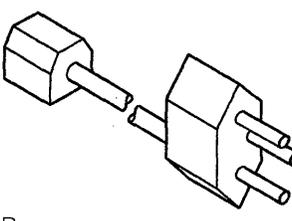
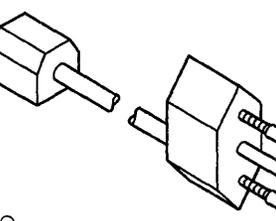
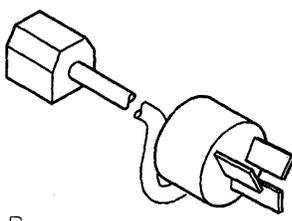
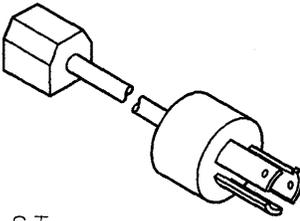
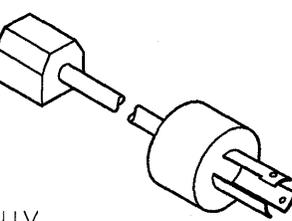
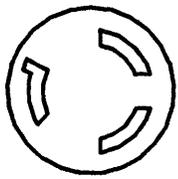
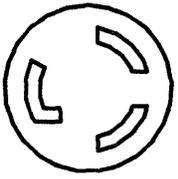
DETAIL **B**

DETAIL **C**

Asm – Index	Part Number	Units	Description
1 – 55A		1	• Memory Card,2 Meg-Models 61R,62R and 63R
– 55B		1	• Memory Card,1 Meg-Models 61R, 62R and 63R Only
– 55B		1	• Memory Card,2 Meg-Models 61R,62R and 63R Only
– 55C	25F8394	1	• Tape
– 55D	25F8601	1	• Tape,Shield
– 56	6423109	1	• Plenum Asm-Models 51R,52R and 53R
– 56	25F7455	1	• Plenum Asm-Models 61R,62R and 63R
– 57	7362385	8	• Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 58	1621214	4	• Screw,Pan HD-M5 X 25 Long
– 59	25F7209	1	• • Fan
– 60	1621155	4	• • Screw,Pan HD-M3 X 40mm Long
– 60A	1622302	4	• • Washer,Flat- 3.2 ID X 7 OD X .5 Thk
– 61	6168801	1	• • Guard,Fan
– 62	6423097	2	• • Cable Assembly,Fan(Old Style) For Component Parts,See Asm 2
– 63	6423113	4	• • Spacer,Fan
– 64	6323426	1	• • Bracket,Fan Conn-Models 51R,52R and 53R Only
– 65	1621812	1	• • Screw,Thd Form Hex Wshr HD-M4 X 8 Long
– 66	6423119	1	• • Plenum-Models 51R,52R and 53R
– 66	25F7454	1	• • Plenum-Models 61R,62R and 63R
– 66A	26F0031	1	• Spring,Rear-Models 61R,62R and 63R Only
– 66B	6251703	2	• Stud
– 66C	6423314	3	• Nut
– 67		NP	• Board,Populated
– 67A	1621171	2	• • Screw,Pan HD-M3 X 8 Long
– 67B	1622401	2	• • Nut,Hex-M3 X 5.5 FI W X 2.4 Thk
– 67C	73X3746	1	• • Bracket,EMC-BNC Support

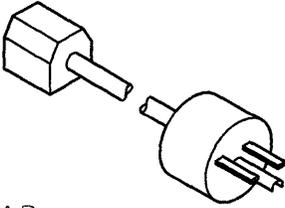
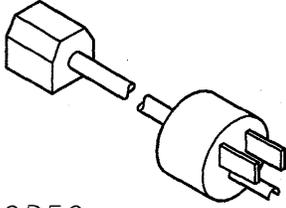
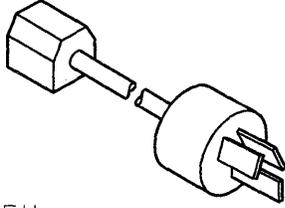
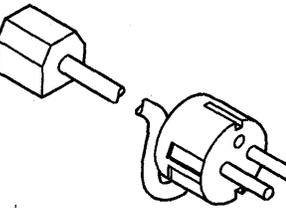
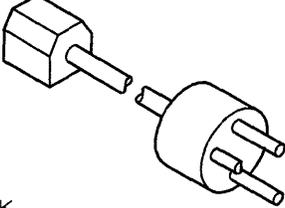
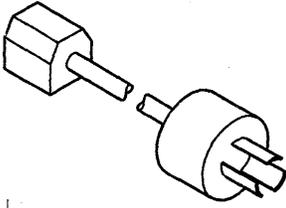
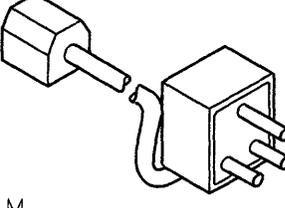
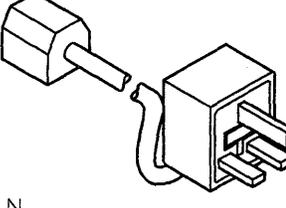
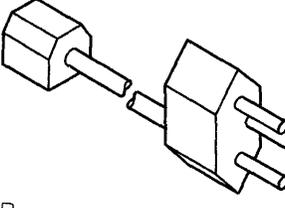
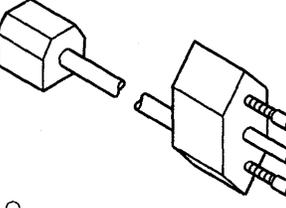
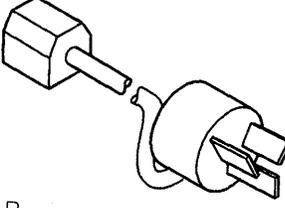
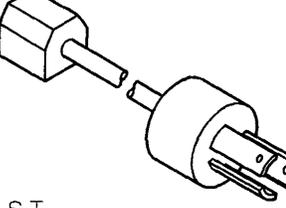
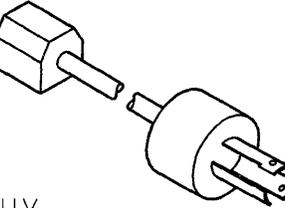
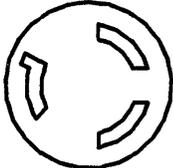
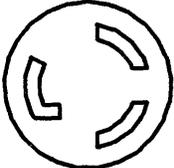
Asm – Index	Part Number	Units	Description
1 – 67D	25F9847	1	• Support,Card
– 68	6423104	1	• Cabinet Assembly
– 69	6423016	1	• • Casting,Rear
– 70	1621813	2	• • Screw,Thd Form Hex Wshr HD-M4 X 16 Long
– 71	7362385	1	• • Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 72	6423138	1	• • Rail,Mtg-RH
– 73	6423137	1	• • Rail,Mtg-LH
– 74	7362385	12	• • Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 75	6423436	2	• • Stop,Tray
– 76	7362385	4	• • Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 77	6168387	1	• • Tray,Manual
– 78	6423125	1	• • Bracket-DC Power Supply
– 79	7362385	2	• • Screw,Thd Form Hex Wshr-M4 X .7 X 8 Long
– 80	6423015	1	• • Casting,Front
– 81	1621813	3	• • Screw,Thd Form Hex Wshr HD-M4 X 16 Long
– 82	1154429	4	• • Pad,CBM
– 83	1164976	4	• • Screw,Foot Mounting- .250-20 X .404 Long
– 84	6423017	1	• • Casting,Base
– 85		1	• Linecord-For Linecords,See Asm 2

Assembly 2: Cable Assemblies With Component Parts

 <p>A,B</p>	 <p>C,D,F,G</p>	 <p>E,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>RECEPTACLE</p>
 <p>RECEPTACLE</p>			

Asm – Index	Part Number	Units	Description
2 – A	1838573	1	Attachment Cord,Pwr(10A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure A
– B	1838576	1	Attachment Cord,Pwr(10A/250V) 1.8m Unshielded-USA For Molded Plug,See Figure B
– C	1838584	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-USA(Hospital Shield) For Molded Plug,See Figure C
– D	1838587	1	Attachment Cord,Pwr(10A/125V) 1.8m Unshielded-USA(Hospital Shield) For Molded Plug,See Figure D
– E	6952290	1	Attachment Cord,Pwr(10A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure E
– F	6952299	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure F
– G	6952301	1	Attachment Cord,Pwr(10A/125V) 1.8m Unshielded-USA For Molded Plug,See Figure G
– H	6952310	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure H
– J	6952319	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure J
– K	6952328	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-Denmark/EMEA For Molded Plug,See Figure K
– L	6952337	1	Attachment Cord,Pwr(10A/125V) 4.3m Unshielded-Japan/AFE/USA For Molded Plug,See Figure L
– M	6952346	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure M
– N	6952355	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA For Molded Plug,See Figure N
– P	6952364	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-EMEA For Molded Plug,See Figure P
– Q	6952373	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-AFE/USA/EMEA For Molded Plug,See Figure Q

Assembly 2: (continued)

 <p>A,B</p>	 <p>C,D,F,G</p>	 <p>E,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>RECEPTACLE</p>
 <p>RECEPTACLE</p>			

Asm – Index	Part Number	Units	Description
2 – R	6952382	1	Attachment Cord,Pwr(6A/250V) 4.3m Unshielded-Israel/EMEA For Molded Plug,See Figure R
– S	7842122	1	Attachment Cord,Pwr(10A/250V) Twist Lock, 1.8 Unshielded-USA For Molded Plug,See Figure S
– T	7842124	1	Attachment Cord,Pwr(10A/250V) Twist Lock, 4.3m Unshielded-USA For Molded Plug,See Figure T
– U	7842140	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 1.8m Unshielded-USA For Molded Plug,See Figure U
– V	7842142	1	Attachment Cord,Pwr(10A/125V) Twist Lock, 4.3m Unshielded- USA/Canada/Nicaragua For Molded Plug,See Figure V
– W	66X2653	1	Cable Asm-Internal,I/O Token Ring Network
– W	25F8418	1	Cable Asm-Internal Signal Models 61R,62R and 63R Only
– X	6168155	1	Cable Asm-External,X.21 - 6m
– X	6168156	1	Cable Asm-External,X.21 - 12m
– Y	39F7858	1	Cable Asm-External,EIA - 6m
– Y	6423154	1	Cable Asm-External,EIA - 12m
– Z	25F8490	1	Cable Asm-External,V.35 - 6m-USA/WT
– Z	6423327	1	Cable Asm-External,V.35 - 12m-USA/WT
– AA	25F8491	1	Cable Asm-External,V.35 - 6m-French and Switzerland
– AA	6423328	1	Cable Asm-External,V.35 - 12m-French and Switzerland
– BB	6165837	1	Cable Asm-External,Token Ring Network
– CC	25F8492	1	Cable Asm-External EIA-Japan
– DD	25F8378	1	Cable Asm-Adapter

Part Number Index

Part Number	Asm - Index	Page	Part Number	Asm - Index	Page	Part Number	Asm - Index	Page	Part Number	Asm - Index	Page
138754	1-26	5-9	25F8418	2-W	5-23	6168593	1-29	5-11	6423443	1-17	5-7
401530	1-26	5-9	25F8428	1-42	5-13	6168594	1-29	5-11	66X2412	1-19	5-7
401534	1-26	5-9	25F8429	1-29E	5-11	6168595	1-29	5-11	66X2413	1-19	5-7
811825	1-11A	5-7	25F8472	1-29C	5-11	6168596	1-29A	5-11	66X2653	2-W	5-23
	1-39A	5-13	25F8490	2-Z	5-23	6168801	1-42B	5-13	6812829	1-26	5-9
855284	1-3	5-7	25F8491	2-AA	5-23		1-61	5-17	6812830	1-26	5-9
855285	1-2	5-7	25F8492	2-CC	5-23	6251703	1-66B	5-17	6812831	1-26	5-9
01F3344	1-45	5-15	25F8601	1-55D	5-17	6323426	1-64	5-17	6815183	1-25	5-9
1154429	1-82	5-19	25F9847	1-67D	5-19	6423015	1-80	5-19	6815188	1-26	5-9
1164976	1-83	5-19	2596291	1-52	5-15	6423016	1-69	5-19	6825818	1-26	5-9
1359009	1-22	5-7	2596293	1-33	5-13	6423017	1-84	5-19	6825840	1-26	5-9
1621155	1-42D	5-13	26F0031	1-66A	5-17	6423018	1-9	5-7	6952290	2-E	5-21
	1-60	5-17	2677406	1-25	5-9	6423051	1-8	5-7	6952299	2-F	5-21
1621171	1-67A	5-17	39F7831	1-31	5-11	6423052	1-5	5-7	6952301	2-G	5-21
1621190	1-6	5-7	39F7834	1-31	5-11	6423056	1-20	5-7	6952310	2-H	5-21
1621214	1-58	5-17	39F7835	1-32	5-13	6423094	1-43	5-15	6952319	2-J	5-21
1621811	1-14	5-7	39F7858	2-Y	5-23	6423097	1-62	5-17	6952328	2-K	5-21
1621812	1-65	5-17	39F7906	1-32	5-13	6423104	1-68	5-19	6952337	2-L	5-21
1621813	1-70	5-19	4418722	1-26	5-9	6423107	1-18	5-7	6952346	2-M	5-21
	1-81	5-19	4420467	1-26	5-9	6423109	1-56	5-17	6952355	2-N	5-21
1621832	1-44	5-15	4423212	1-25	5-9	6423110	1-4	5-7	6952364	2-P	5-21
	1-49	5-15	4494962	1-26	5-9	6423112	1-20	5-7	6952373	2-Q	5-21
1622302	1-42E	5-13	4796653	1-37	5-13	6423113	1-63	5-17	6952382	2-R	5-23
	1-60A	5-17	5267921	1-28	5-9	6423115	1-34	5-13	73X3746	1-67C	5-17
1622334	1-7	5-7	5267922	1-28	5-9	6423116	1-31	5-11	73X3979	1-29B	5-11
1622346	1-47	5-15	5267923	1-28	5-9	6423119	1-66	5-17	7362385	1-39	5-13
	1-50	5-15	5267924	1-28	5-9	6423120	1-30	5-11		1-41	5-13
1622401	1-67B	5-17	5267925	1-28	5-9	6423125	1-78	5-19		1-46	5-15
1622403	1-51	5-15	5267926	1-28	5-9	6423131	1-24	5-7		1-57	5-17
1743548	1-25	5-9	5267927	1-28	5-9	6423132	1-24	5-7		1-71	5-19
1743549	1-25	5-9	5267973	1-10B	5-7	6423133	1-24	5-7		1-74	5-19
1838573	2-A	5-21	56X4700	1-15	5-7	6423136	1-35	5-13		1-76	5-19
1838576	2-B	5-21	5627920	1-28	5-9	6423137	1-73	5-19		1-79	5-19
1838584	2-C	5-21	5685244	1-25	5-9	6423138	1-72	5-19	7842122	2-S	5-23
1838587	2-D	5-21		1-25	5-9	6423139	1-38	5-13	7842124	2-T	5-23
25F7207	1-42C	5-13	5718466	1-25	5-9	6423144	1-31	5-11	7842140	2-U	5-23
25F7209	1-59	5-17	5953429	1-1	5-7	6423149	1-32	5-13	7842142	2-V	5-23
25F7454	1-66	5-17	61X4653	1-11	5-7	6423150	1-32B	5-13	83X9764	1-27	5-9
25F7455	1-56	5-17	6128621	1-10A	5-7	6423154	2-Y	5-23	83X9765	1-27	5-9
25F7456	1-32	5-13	6165837	2-BB	5-23	6423233	1-31	5-11	83X9934	1-28	5-9
25F7457	1-32A	5-13	6168155	2-X	5-23	6423314	1-66C	5-17	8326797	1-25	5-9
25F8330	1-14A	5-7	6168156	2-X	5-23	6423327	2-Z	5-23	8326801	1-25	5-9
25F8366	1-34	5-13	6168378	1-29	5-11	6423328	2-AA	5-23	8551903	1-26	5-9
25F8367	1-24	5-7	6168379	1-29	5-11	6423424	1-16	5-7	8551904	1-25	5-9
25F8368	1-24	5-7	6168380	1-29	5-11	6423427	1-40	5-13	8575392	1-34	5-13
25F8369	1-24	5-7	6168381	1-55	5-15	6423428	1-42A	5-13			
25F8371	1-29D	5-11	6168382	1-53	5-15	6423429	1-42	5-13			
	1-31	5-11	6168383	1-54	5-15	6423430	1-13	5-7			
25F8378	1-29C	5-11	6168387	1-77	5-19	6423436	1-75	5-19			
	2-DD	5-23	6168468	1-34	5-13	6423437	1-17	5-7			
25F8391	1-48	5-15		1-36	5-13	6423438	1-17	5-7			
25F8392	1-48	5-15	6168470	1-12	5-7	6423439	1-17	5-7			
25F8394	1-55C	5-17	6168584	1-21	5-7	6423440	1-17	5-7			
25F8399	1-34	5-13	6168585	1-23	5-7	6423441	1-17	5-7			
	1-36	5-13	6168592	1-29	5-11	6423442	1-17	5-7			

Appendix A. IBM Cabling System

3299 Terminal Multiplexer Reference Information	A-3
3299 Model 1	A-3
3299 Model 2	A-3
3299 Model 3	A-3
3299 Model Interchangeability	A-4
3299 Cabling	A-4
Device Signal Cable Media Connectors	A-6

The IBM Cabling System allows customers to interconnect devices within a single building or a group of buildings located close together. This cabling system uses a star wiring arrangement, which means that individual cables run from a concentration point to each user's work area. Figure B-1 shows an example of a typical cabling system installation.

Note: This appendix is not intended to give full details on the IBM Cabling System. It is here as an aid in problem determination for the 3174 Establishment Controller. For further details, see the *IBM Cabling System Planning and Installation Guide, GA27-3361*

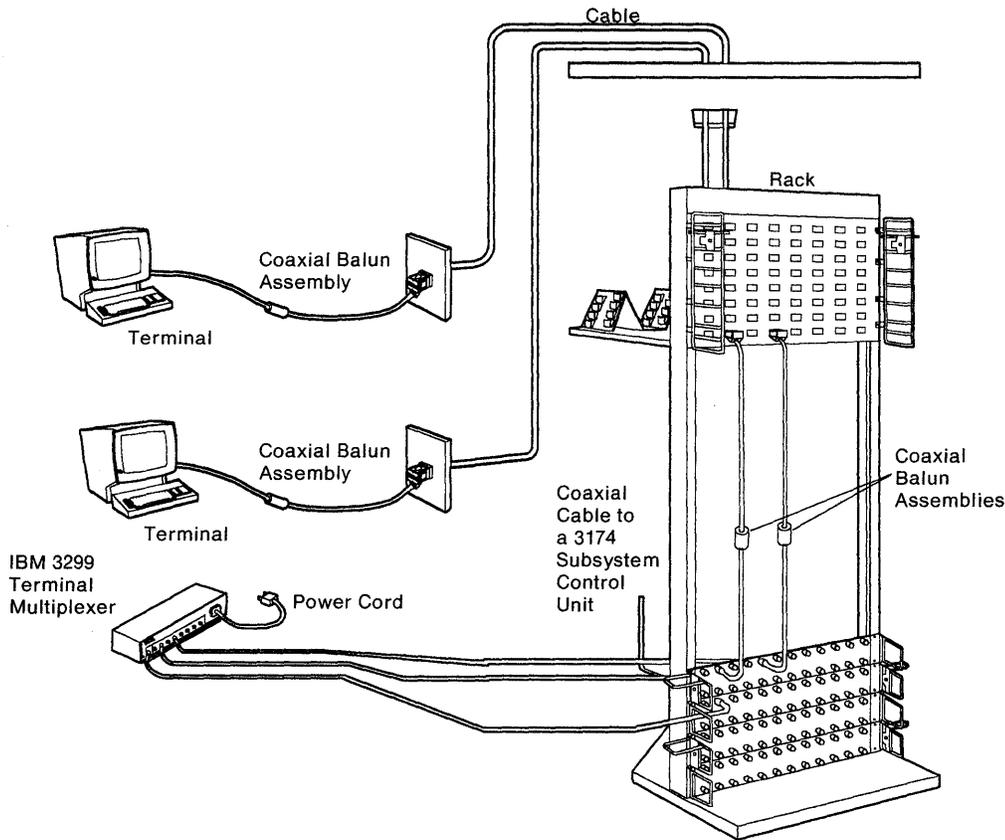


Figure A-1. IBM Cabling System

3299 Terminal Multiplexer Reference Information

This section contains information about 3299 Terminal Multiplexers Models 1, 2, and 3 and IBM Cabling System (ICS) cables that can be used with the 3299. This information is not intended to provide all the details about 3299s and the IBM Cabling System. It is here as an aid in problem determination for the 3174 controller.

The 3299 Terminal Multiplexer attaches to port 0 on the 3174 terminal adapter. The input signals from the terminal adapter contain addressing to select one of eight possible 3299 output driver/receiver ports. The distance 3299s are located from the controller depends on the cable media being used and whether the particular 3299 requires a balun. See Table A-1.

Table A-1. 3299 Attached Terminal Cable Lengths		
Cable Media	Baluns	Maximum Distance from 3299
Coaxial Cable	None required	1525 Meters (5000 Feet)
IBM Cabling System Type 1 or 2 Cable	0	1525 Meters (5000 Feet)
IBM Cabling System Type 1 or 2 Cable	1	1000 Meters (3280 Feet)
IBM Cabling System Type 1 or 2 Cable	2	610 Meters (2000 Feet)
IBM Cabling System Type 3 Cable	1	274 Meters (900 Feet)
IBM Cabling System Type 3 Cable	2	30 – 274 Meters (100 – 900 Feet)

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

3299 Model 1

The 3299 Terminal Multiplexer Model 1 is packaged in a single box that contains circuitry to multiplex the data streams of eight terminals onto a single coaxial or twisted pair cable from the 3174. It also increases the distance that terminals can be located from the 3174 as shown in Table A-1.

3299 Model 2

The 3299 Model 2 is a modified version of the 3299 Model 1. It provides the capability of being attached to the IBM Cabling System directly either with coaxial cable or IBM data grade twisted-pair cables. Telephone twisted-pair cables (type 3 specified) can also be used, although they require an IBM/ROLM balun. A wrap test can be performed on the 3299 Model 2 that is attached to a 3174. The microcode to drive this test is in the 3174.

3299 Model 3

The 3299 Model 3 is identical in function to the 3299 Model 2. The primary difference is that it connects directly to the IBM Cabling System type 3 specified cable (telephone twisted-pair). The eight output ports on the Model 3 are RJ11 type connectors, which accept only telephone type twisted pair (TTP). The connection to the 3174 is through coaxial cable or through IBM Cabling System using a dual purpose connector (DPC). This connector accepts either a BNC-style connector or an IBM Cabling System

connector. A wrap test can be performed on the 3299 Model 3 that is attached to a 3174. The microcode to drive this test resides in the 3174.

Note: Only IBM Cabling System type 3 specified cable is supported from the 3299 Model 3 to a terminal. Flat telephone wire and stubs (wires that are not terminated) are not supported.

3299 Model Interchangeability

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

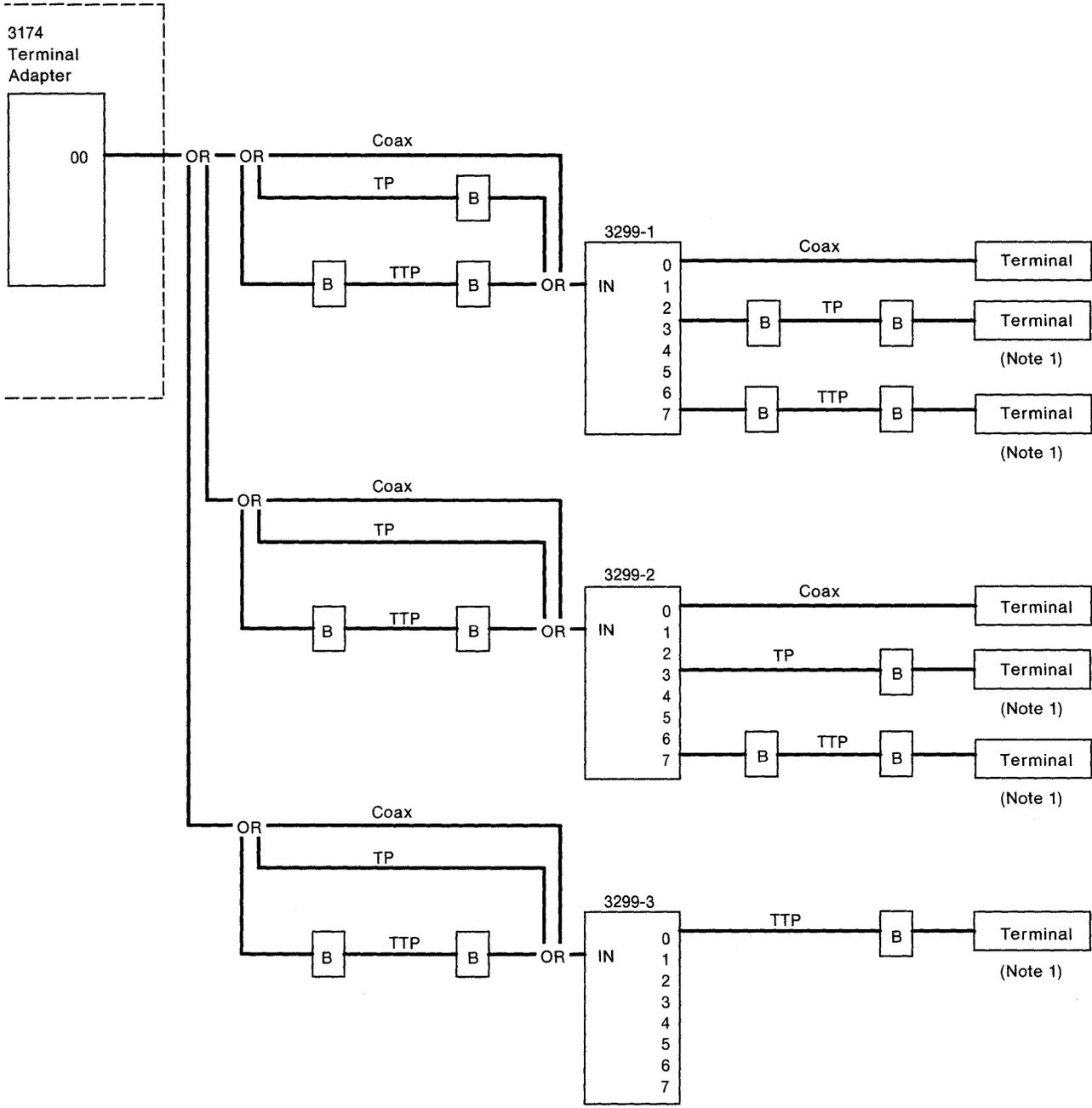
- A 3299 Model 1 can be replaced with a Model 1 or a Model 2
- A 3299 Model 2 can be replaced only with a Model 2.

Note: If coaxial cable is the only cable media being used to connect the terminals to the 3299, then a 3299 Model 2 can be replaced with a Model 1.

- A 3299 Model 3 can be replaced only with a Model 3.

3299 Cabling

Figure A-2 on page A-5 shows the possible subsystem cabling for the 3299 Models 1, 2, and 3 with the different type of cabling media that is supported with and without baluns.



B = Balun
 TP = Twisted Pair, IBM Cabling System Type 1, 2
 TTP = Telephone Twisted Pair, IBM Cabling System Type 3

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

Figure A-2. 3299 Cabling

Device Signal Cable Media Connectors

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

Older 3270 products, such as Model 13299s use a standard BNC jack and accept only standard BNC connectors that are used with coaxial cabling or the coax-to-twisted-pair balun. New 3270 products, such as the 3174, and some new display products, use the dual-purpose connector (DPC) jack, which is designed to accept both the coaxial BNC connector and the dual-purpose connector.

The products that use the DPC connector have two sets of cable media matching circuitry to support the attachment of coaxial cable or IBM Cabling System cable media. The connector on the cable mechanically connects the proper impedance matching circuit elements to the product DPC jack.

The BNC and DPC jacks are not easily distinguished; however, there are slight differences. The inner center conductor insulator on the DPC jack has an additional conductor located in the center. The DPC cable connector is identified by an insulator tube that extends approximately 5mm (3/16 of an inch) beyond the body of the connector. See Figure A-3.

Because of this insulator the DPC connector cannot be connected to a BNC jack. However, a BNC connector can be connected to a DPC jack.

When swapping device cables it is very important to swap a cable only with another cable that has an identical connector on the end of the cable.

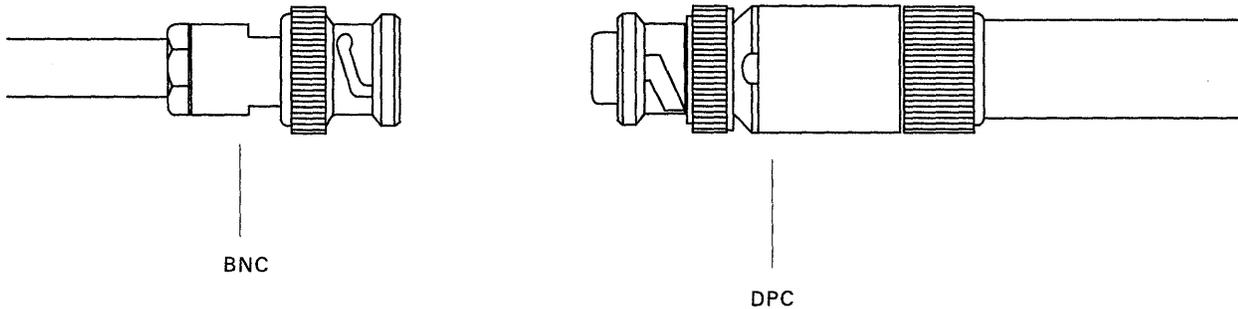


Figure A-3. BNC and DPC Connectors.

Appendix B. X.25 Feature

X.25 Elements	B-3
Physical Level	B-3
Link Level	B-3
Packet Level	B-3
Logical Link Control	B-3
Timers	B-4
X.25 Network	B-4
Virtual Circuits	B-4
Logical Channels	B-4
Packet Types	B-4
Call Request (SVC)	B-5
Incoming Call (SVC)	B-5
Call Accepted (SVC)	B-5
Call Connected (SVC)	B-5
Clear Request (SVC)	B-5
Clear Indication (SVC)	B-5
Clear Confirmation (SVC)	B-5
Reset Request (PVC)	B-5
Reset Indication (PVC/SVC)	B-6
Reset Confirmation (PVC/SVC)	B-6
Restart Request (PVC/SVC)	B-6
Restart Indication (PVC/SVC)	B-6
Restart Confirmation (PVC/SVC)	B-6
Data (PVC/SVC)	B-6
Receiver Not Ready (PVC/SVC)	B-6
Receiver Ready (PVC/SVC)	B-6
Diagnostic (PVC/SVC)	B-7
Switched Virtual Circuit (SVC)	B-7
Key Functions	B-7
Indicators	B-7
X.25 States	B-8
Normal Operating Procedure	B-8
Call Ready (SVC only)	B-9
Data Ready	B-10
Disconnection (SVC)	B-10
Cause and Diagnostic Indicators	B-11
Incoming Call	B-11
Local Mode	B-11
Exceptional Case Handling	B-11
X.25 SVC States and Key Operation	B-12
Indicators	B-15
Call Ready	B-15
Dial In	B-15
At Dial-Originating Station:	B-15
At Other Stations	B-15
Outgoing Call in Progress	B-15
Incoming Call in Progress	B-15
Data Ready (In Use)	B-16
Disconnect in Progress	B-16
Local	B-16
X.25 Communication Reminder Indicator	B-16
Extension Key	B-17

A.25 Feature

Extension Mode	B-17
Extension Key and X.25 Function Keys	B-19
Dial Mode Screen	B-19
Permanent Virtual Circuit (PVC)	B-22
PVC Indicators	B-22
PVC Keys	B-22
LOCAL Key	B-22
COMM Key	B-22
Summary of States and Indicators	B-23
Primary Virtual Circuit	B-23
Switched Virtual Circuit	B-24
X.25 Cause and Diagnostic Codes	B-24
Cause Codes	B-24
Reset Indication Packet	B-25
Restart Indication Packet	B-26
Diagnostic Code Modifiers	B-26
Diagnostic Codes from DCE	B-27
Diagnostic Codes from DTE	B-28

The Type 1 Communication Adapter or Type 1 Concurrent Communication Adapter in the 3174 controller enables the 3174 to communicate with host systems through an X.25 network. IBM-defined SNA protocols are used. The SNA protocols used by the 3174 are identical with existing 3274 SNA attachments. They are not detailed here. These SNA protocols are described in the *3174 Functional Description*, GA23-0218 and *X.25 Operations*, GA23-0214.

The International Telegraph and Telephone Consultative Committee (CCITT) recommendation is that X.25 define an interface between customer data terminal equipment (DTE) and data circuit-terminating equipment (DCE) to attach DTEs to Packet Switched Data Networks (PSDNs).

The definition includes:

Physical Level	The mechanical, electrical, functional, and procedural characteristics to activate, maintain, and deactivate physical communication links between DTEs and DCEs.
Link Level	The link access procedure for interchange of data across communication links between DTEs and DCEs.
Packet Level	The packet formats and logical protocols for the exchange of control information and user data between DTEs and DCEs.

To use the X.25 function, the 3174 must have a 3278, 3279, or similar display station attached.

X.25 Elements

Physical Level

- X.21 leased circuit
- X.21 bis (V.24 or V.35) leased circuit
- CCITT
- Transmission is nonreturn to zero (NRZ) with clocking externally supplied
- Up to 48 000 bps for 3174 Model 1R

Link Level

- Link Access Procedure Balanced (LAPB)
- Modulo 8 Link Level Sequence Numbering

Packet Level

- Single virtual circuit (switched or permanent)
- Modulo 8 or 128 packet-level sequence numbering
- Data packet sizes of 64, 128, 256, or 512 bytes
- Packet window sizes of 1 to 7 for modulo 8
- Packet window sizes of 1 to 11 for modulo 128

Logical Link Control

One of the following:

- Qualified Logical Link Control (QLLC)
- Physical Services Header (PSH).

Timers

The timer values listed in Table B-1 are supplied. These values are derived from the type 1 communication adapter timers and have an accuracy of the stated values plus or minus 20%.

Table B-1. X.25 Timer Values		
Timer	Value (In Seconds)	5NN
Receive timeout	30	532 20
Packet timeout	200	532 21
Transmit failure (write timeout)	36	501 04
Open timeout	25.6	506 02
Tp(T1)/Np(N2)	Customer-specified values (configuration responses 450 and 451)	

X.25 Network

This section describes X.25 virtual circuits and logical channels.

Virtual Circuits

A permanent virtual circuit (PVC) may be thought of as a point-to-point SDLC leased line. A switched virtual circuit (SVC) may be thought of as a point-to-point switched line.

Logical Channels

Each virtual circuit is assigned a logical channel group number (0–15) and a logical channel number (1–255) by the Packet Switched Data Network (PSDN). These two numbers make up the logical channel identifier (LCID). This LCID may be entered while the 3174 is being configured.

The following logical-channel types may exist:

- Permanent channel — Used for a PVC dedicated to data transfer between a 3174 and a specific host DTE.
- Outgoing channel — Used for an SVC where only the 3174 can initiate a call.
- Incoming channel — Used for an SVC where only a remote DTE can initiate a call.
- Two-Way channel — Used for an SVC where either the 3174 or the remote DTE can initiate a call.

Packet Types

The following X.25 packet types are supported by the 3174. The cause and diagnostic codes mentioned in the descriptions are defined later in this appendix.

Call Request (SVC)

The Call Request packet is transmitted by the 3174 when an X.25 dial operation is performed by the operator. This packet contains the called number and optional information which matches the user's subscription. The optional information is based on the options selected while configuring or operator input.

Incoming Call (SVC)

The Incoming Call packet is received by the 3174 as a result of a remote DTE transmitting a Call Request Packet. The 3174 examines the data in the packet (based on options selected during configuration) to ensure that it conforms to the information configured or as specified by the display operator through a dial operation.

Call Accepted (SVC)

The Call Accepted packet is sent by the 3174 after an Incoming Call packet has been received that conforms to the network facilities specified.

Call Connected (SVC)

The Call Connected packet is received by the 3174 as confirmation that the remote DTE has accepted the 3174's Call Request. The circuit is now in the data-ready state, and SNA protocols may begin.

Clear Request (SVC)

The Clear Request packet is sent by the 3174 as a result of an X.25 disconnect operation by the operator or the network (normal circuit termination), or as a result of certain errors detected by the 3174 or the network. Cause and diagnostic codes are included. If caused by a 3174-detected error, the codes are logged and displayed by the operator.

Clear Indication (SVC)

The Clear Indication packet is received by the 3174 as a result of a normal clearing sequence, or as a result of problems detected by the network or the remote DTE. The circuit is stopped, a Clear Confirmation packet is sent, and nonzero cause and diagnostic codes are logged and displayed to the operator.

Clear Confirmation (SVC)

The Clear Confirmation Packet is sent by the 3174 to acknowledge the receipt of a Clear Indication packet or may be received by the 3174 in a network response to Clear Request packet.

Reset Request (PVC)

The Reset Request packet is sent when the 3174 detects certain X.25 errors. Cause and Diagnostic codes are included and logged. The 3174 then attempts to reopen the circuit. The Reset Request packet is not sent during normal PVC operation wherein the 3174 remains connected to the circuit/link until powered off. A Reset Request packet is sent as part of a LOCAL key operation when the circuit is connected, or upon detection of certain X.25 network error conditions. The SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence.

Reset Indication (PVC/SVC)

The Reset Indication packet is received by the 3174 as a result of problems detected by the network or the remote DTE. The circuit is stopped, and the error condition is logged with cause and diagnostic codes. The SNA layers must be reactivated through a QSM (SNRM), ACTPU, ACTLU sequence.

Reset Confirmation (PVC/SVC)

The Reset Confirmation packet is transmitted by the 3174 to acknowledge receipt of a Reset Indication packet, or the Reset Confirmation packet may be received by the 3174 in confirmation of a Reset Indication packet.

Restart Request (PVC/SVC)

The Restart Request packet is sent when the 3174 is closing the link due to detecting certain X.25 errors or when a LOCAL key has been accepted. The Restart Request packet is also sent when an open-link operation is performed. Open-link operations are performed when:

- An 3174 IML is performed
- Local mode has been entered and the COMM key is pressed
- The link has been closed because of an error condition.

In this event, the 3174 immediately attempts to open the link. Cause and diagnostic codes are included and logged. When the open-link operation occurs because of error conditions, the codes and the Communication Reminder indicator are displayed.

Restart Indication (PVC/SVC)

When the Restart Indication packet is received, the 3174 responds with a Restart Confirmation packet, shuts down the link, notifies the operator by displaying an indicator with cause and diagnostic codes, and logs the error.

Restart Confirmation (PVC/SVC)

When the 3174 has sent a Restart Request packet as a result of attempting to initialize packet level operation, receipt of a Restart Confirmation packet signals the completion of initialization. The 3174 sends a Restart Confirmation packet whenever a Restart Indication packet is received from the DTE.

Data (PVC/SVC)

The data packet is used to transmit and receive data once a circuit has been established.

Receiver Not Ready (PVC/SVC)

When the 3174 receives a Receiver Not Ready packet, the 3174 stops transmission until a Receiver Ready is received. The 3174 does not send a Receiver Not Ready packet.

Receiver Ready (PVC/SVC)

The Receiver Ready packet is sent by the 3174 in response to any packet that is received unless an outgoing data packet is ready for transmission. Receipt of a Receiver Ready packet indicates that transmission by the 3174 may continue.

Diagnostic (PVC/SVC)

The Diagnostic packet contains diagnostic information and is received when a reset, clear, or restart packet is not appropriate. The cause and diagnostic information is logged, and no further action is taken.

Switched Virtual Circuit (SVC)

The X.25 SVC capability of the 3174 Establishment Controller permits the operator of an attached 3178, 3278, 3279, or similar display station to connect the 3174 and its attached terminals to a remote host system through an X.25 packet switched network. Note that this capability is not supported on distributed function terminals, such as the 3290 Information Panel.

The functions necessary to connect the 3174 to the remote host are invoked by operator actions at the keyboard (and incoming calls). The status of the 3174 with respect to the network is conveyed to the operator with indicators in the operator information area of the display screen.

To support X.25 SVC functions, additional key functions and indicators are provided at the display. These key functions are a subset of the X.21 Switched feature. The indicators (symbols in the operator information area) are the same as those used in the X.21 Switched feature except that the indicators containing call progress signals in the X.21 feature are redefined and expanded to contain cause and diagnostic codes.

Note: Operator information area indicators are defined in the problem determination guide for your display station.

Key Functions

- Extension Key
- DIAL key
- DISC (disconnect) key
- LOCAL key
- COMM (communication) key
- LOAD MATRIX key

The device attached to port 0 normally has access to the full complement of X.25 Switched function keys. The LOAD MATRIX key function is assigned to port 0 only. The other keys may optionally be assigned to all ports, or certain keys may be deleted, depending on how the 3174 was configured.

See Figure C-4 for details.

Indicators

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

Call Ready	Dial In (dialing terminal)
Dial In (other terminals, same controller)	Outgoing Call in progress
Incoming Call in progress	Disconnect in progress
Local (Z 599)	X.25 Communication Reminder

The following indicator is displayed in the Do Not Enter area:

- Operator Communication Check

The following indicator is displayed in the Readiness and System Connection area:

- In Use (N)

The following indicator is displayed in the Shifts and Modes area:

- Extension Mode

X.25 States

- Call Ready — Circuit is in the disconnected state. It is possible to attempt a connection.
- Local— Link and circuit are disconnected. It is impossible to perform a connecting operation.
- In-Use — Circuit is connected and ready for data.
- Incoming Call or Outgoing Call — Connection operation is in progress.
- Disconnection in progress — Disconnection operation is in progress.
- Error — Error states are displayed by the Machine Check and Communication Check indicators.

Normal Operating Procedure

All the X.25 SVC operations are performed using the display station keyboard, screen, and the operation information area of the screen. The indicators that are displayed in the operator information area are defined in the attached display station problem determination guide.

Note: Because there are not enough key positions to execute each X.25 Switched operation by a single keystroke, a key called the Extension key is defined. To execute any of the X.25 function keys (and the LOAD MATRIX key), the sequence is:

1. Press and hold the ALT key.
2. Press the Extension key(>).
3. Release the ALT and Extension keys.
4. Press the desired X.25 function key.

Except for this section, pressing the ALT and Extension keys is not mentioned in this manual. Thus, "press the DIAL key" means press the ALT and Extension keys and press the DIAL key.

When the X.25 function is used, the LOAD MATRIX KEY function is moved from position 38 to position 15.

The X.25 function keys and positions are:

- DIAL key (position 4)
- LOCAL key (position 5)
- COMM (Communication) key (position 6)
- DISC (Disconnect) key (position 8)
- LOAD MATRIX KEY (Load Host Print Matrix; port 0 only) (position 15).

Key layout is defined later in this appendix.

Indicators to show X.25 states are displayed in the Reminder area of the operator information area. The Input Inhibited indicator (X) is displayed per normal 3174 function. The In Use indicator (N) is displayed in location 7 of the Readiness and System Connection Area.

X.25 state indicators disappear while a Communication Check Reminder indicator is displayed.

The Operator Communication Check indicator has a higher priority than the Communication Check indicator and a lower priority than the Machine Check indicator.

Call Ready (SVC only)

- After power is on and the link is operational, the Call Ready indicator is displayed.
- The DIAL key, LOCAL key, or an Incoming Call is accepted when the Call Ready indicator is displayed.

When the DIAL key is pressed in call-ready state, the Dial indicator replaces the Call Ready indicator. The DIAL key initiates keyboard reset and clear functions simultaneously. The reset function restores the keyboard, repositions the cursor to home, returns to the base character set, and restores all input-inhibit conditions except:

- Wait
- Device busy
- Device very busy
- Device not functional
- Security key.

If the keyboard is not reset, the DIAL key performs no function, and extension mode is exited.

The dial screen is displayed. (See "Dial Mode Screen" on page B-19 for a definition of the dial screen.) The appropriate information is entered by the operator.

After the information is keyed in, the ENTER key is pressed. If the data is successfully validated by the 3174, the data entered by the operator is stored, a Call Request packet is assembled and transmitted by the 3174, and the Outgoing Call in Progress indicator replaces the dial indicator.

If the ENTER key has not been pressed, or if the entered data was not valid, the information stored by the last successful DIAL/ENTER key operation may be retrieved by pressing the DIAL key again. When dial mode has been entered by a display station, an attempted entry of dial mode at any other display station is inhibited and the Operator Communication Check indicator is displayed.

When in dial mode, the DISC key on other terminals operates normally.

Dial mode operations are shown in Figure B-1 on page B-10.

Pressing the CLEAR key while in dial mode causes the input fields on the screen to be restored from the previously stored values. Once there is no connection with a host application, no AID-generating operation is attempted.

When the online test 0 (/0) is directed to a terminal in dial mode, the dial mode is reset, the call-ready mode is set, the terminal enters test mode, and the test is executed.

Action Taken	Symbol	Dialing Terminal	Symbol	Other Terminals
DIAL key		Accepted. Display Dial screen with saved parameters	or	Rejected.
LOCAL key		Accepted. (See Note.)	or	Rejected.
COMM key		Ignored.		Ignored.
DISC key		Accepted. (See Note.)		Accepted. (See Note)
TEST key	TEST	Accepted. Abort Dial In.	TEST or	Accepted.
ENTER key	(if ok) or (if not ok)	Validate input. If OK, accept ENTER key, update parameters, initiate outgoing call. (See Note.)	or	Rejected.
CLEAR key		Accepted. Restore Dial-In.		Accepted. Clear screen.
PA,PF, ATTN, SYS REQ keys	or	Rejected.	or	Rejected.

Note: This indicator is broadcast to all powered terminals.

Figure B-1. Controller/Terminal Responses in Dial-In State

Data Ready

When the circuit is connected, the Incoming Call or Outgoing Call in Progress indicator is reset and the In Use indicator is displayed in the operator information area.

Disconnection (SVC)

The DISC key is pressed whenever the operator wants to disconnect the circuit. If there are SNA sessions active (bound), the 3174 may have been configured so that the first disconnect sequence results in the display of the Operator Communication Check indicator. This serves as a reminder that there are sessions active.

If the DISC key sequence is reinitiated with no intervening RESET key action, the 3174 initiates a disconnection from the circuit by sending the appropriate Clear Request packet. If the RESET key is used to reset the input-inhibited condition, the entire sequence is reset and the next DISC key operation is also inhibited. DISC keys pressed when no sessions are active initiate an immediate disconnection.

A configuration option is provided that allows the DISC key to immediately initiate a disconnection regardless of the status of the LU sessions.

Also, any Clear Indication packet received by the 3174 initiates a circuit disconnection and causes the 3174 to send a Clear Confirmation packet. The cause and diagnostic codes from the Clear Indication packet are displayed in the operator information area.

The disconnect-in-progress state is entered when the DISC key operation is accepted, when a QDISC packet is received, or when the station is closed because of detected SNA-level errors.

The Call Ready indicator replaces the Disconnect in Progress indicator when the line is successfully disconnected. If not in dial mode, the screen is unchanged. If in dial mode, the dialing terminal's screen is cleared and disconnect-in-progress state is entered. Sessions are reset if they exist, and all session-related indicators, including Online, Ownership, System, and Wait are reset.

The In Use indicator is turned off when disconnection is completed. A new Call Request packet is required to reestablish the connection.

Cause and Diagnostic Indicators

Cause and Diagnostic indicators are displayed in the operator information area to aid in user problem determination for abnormal disconnection. They are displayed with the Call Ready indicator when cause and/or diagnostic codes are received by or transmitted from the 3174 because of an error condition. They are not displayed when the 3174 operator causes a normal disconnect through the DISC key function. Cause and diagnostic codes are also displayed with the X.25 Communication Reminder indicator and indicate the cause and diagnostic codes from a Restart/Reset/Clear packet transmitted or received from the 3174.

Note: These codes are CCITT-recommended and IBM-architected. However, these codes may not apply, nor be common, to all networks.

Incoming Call

Incoming Call Request packets are accepted in call-ready state, and the Incoming Call in Progress indicator is displayed. This indicator is reset when the circuit is connected.

Local Mode

In local mode, incoming calls and all outgoing requests are rejected. The 3174 is disconnected from the link.

The LOCAL key is accepted in the call-ready state and the Local Mode indicator is displayed on all the display station screens.

The COMM key is pressed to reset local mode. The call-ready state is entered, and the link is initialized.

Exceptional Case Handling

The operator should take action as follows:

1. Call Ready indicator with C&D codes or X.25 Communication Reminder

For a dial request, this indicator means the request has failed with the network reason specified by the C&D codes. In all cases, the operator should consult the appropriate manual for a recommended recovery action for each C&D code.

2. Communication Reminder indicator while in X.25 SVC mode.

An operator can retry the call, if appropriate, and can determine the state of the connection by the In Use indicator. If the In Use indicator is not displayed, the COMM key can be used to reset the Communication Reminder indicator. The X.25 keys that are allowed in a particular X.25 state (that is, do not result in display of the Operator Communication Check indicator) reset the Communication Reminder indicator. If the error persists, the problem determination manual procedures identified by the particular status code should be followed. See the *IBM 3174 Status Codes* manual for a complete listing of status codes.

3. Machine Check.

This means an error was detected in the 3174 subsystem. The same action as for the base 3174 should be followed.

No unique machine-check numbers are generated.

X.25 SVC States and Key Operation

This section defines how to treat a key when it is pressed in X.25 SVC-specific states. Figure B-2 on page B-12 summarizes these key operations.

In this section, keys other than the following are called "Other" keys:

- DIAL, LOCAL, DISC, and COMM keys
- AID keys (The ATTN key is treated in the same way as the AID keys in this section.)
- TEST key
- SYS REQ key (The SYS REQ key is treated as in the base machine.)

Status	Operation		
	DIAL Key Pressed	ENTER Key Pressed (Dial In complete)	DISC Key Pressed
Call Ready	Accepted. ¹ ↘ # ? or ↘ # #	Accepted. →↘	Ignored. ↘
Call Ready with C&D Codes	Accepted. ¹ ↘ # ? or ↘ # #	Accepted. →↘	Accepted. ² ↘
Outgoing Call in Process	Rejected. ✕ ↘ ↘ →↘	Rejected. ✕ ↘ ↘ →↘	Accepted. ↘
Incoming Call in Process	Rejected. ✕ ↘ ↘ ←↘	Rejected. ✕ ↘ ↘ ←↘	Accepted. ↘
Data Ready	Rejected. ✕ ↘ ↘	Rejected. ✕ ↘ ↘	Accepted. ↘
Disconnect in Process	Rejected. ✕ ↘ ↘ ↘	Rejected. ✕ ↘ ↘ ↘	Ignored. ↘
Local	Rejected. ✕ ↘ ↘ ↘ 599	Rejected. ✕ ↘ ↘ ↘ 599	Rejected. ✕ ↘ ↘ ↘ 599
X.25 Communication Reminder	Rejected. ✕ ↘ ↘ ↘ XCCDD	Rejected. ✕ ↘ ↘ ↘ XCCDD	Rejected. ✕ ↘ ↘ ↘ XCCDD

¹ See Figure C-2 for indicators displayed by Dialing terminal and Other terminals.
² Reset cause and diagnostic (C&D) codes.

Figure B-2 (Part 1 of 3). Key Operations during X.25 States

Operation			
Status	LOCAL Key Pressed	AID Key Pressed	COMM Key Pressed ³
Call Ready	Accepted. ↘ 599	Rejected. ✕-f ↘	Ignored. ↘
Call Ready with C&D Codes	Accepted. ↘ 599	Rejected. ✕-f ↘ XCCDD	Accepted. ⁴ ↘
Outgoing Call in Process	Rejected. ✕ ↘ ↘ ↘	Rejected. ✕-f ↘	Ignored. ↘
Incoming Call in Process	Rejected. ✕ ↘ ↘ ↘	Rejected. ✕-f ↘	Ignored. ↘
Data Ready	Rejected. ✕ ↘ ↘	Same as base machine. ✕-f	Ignored. ↘
Disconnect in Process	Rejected. ✕ ↘ ↘ ↘	Rejected. ✕-f	Ignored. ↘
Local	Ignored. ↘ 599	Rejected. ✕-f ↘ 599	Accepted. ↘ 506
X.25 Communication Reminder	Accepted. ↘ 599	Rejected. ✕-f ↘ XCCDD	Rejected. ✕ ↘ ↘ ↘ XCCDD

³Reset Operator Communication Check indicator

⁴Reset C&D codes.

Figure B-2 (Part 2 of 3). Key Operations during X.25 States

X.25 Feature

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 XCCDD				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 ~*? or ~**	Accepted. ⁵ ~*? or ~**
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

Indicators

Call Ready

While the Call Ready indicator is displayed:

- DIAL, LOCAL, TEST, and “Other” keys are accepted.
- DISC and COMM keys are ignored.
- AID keys are rejected with ‘X–f’ indicator.

If the C&D codes are displayed with the Call Ready indicator:

- DISC and COMM keys clear the C&D codes, and all the “Other” keys are treated in the same way as above.

Dial In

While the Dial In indicator is displayed:

At Dial-Originating Station:

- DIAL, LOCAL, DISC, TEST,* ENTER, and “Other” keys are accepted.
- COMM key is ignored.
- Aid keys (except ENTER and CLEAR) are rejected with ‘X–f’ indicator.

*TEST key aborts the dial-in mode.

At Other Stations

- DIAL and LOCAL keys are rejected with Operator Communication Check Indicator.
- DISC key is ignored.
- COMM key is ignored.
- TEST key and “Other” keys are accepted.
- AID keys are rejected with ‘X–’ indicator.

Outgoing Call in Progress

While Outgoing Call in Progress indicator is displayed:

- DISC, TEST, and “Other” keys are accepted.
- DIAL AND LOCAL keys are rejected with Operator Communication Check indicator.
- COMM key is ignored.
- AID keys are rejected with ‘X–f’ indicator.

Incoming Call in Progress

While Incoming Call in Progress indicator is displayed:

- DISC, TEST, and “Other” keys are accepted.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- COMM key is ignored.
- AID keys are rejected with ‘X–f’ indicator.

X.25 Feature

Data Ready (In Use)

The In Use indicator is displayed in location 7. No indicator is displayed in the Reminder area when the virtual circuit connection with the X.25 network has been established.

- AID, TEST, DISC, and “Other” keys are accepted.
- DISC and COMM keys are ignored.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with ‘X–f’ indicator.

Disconnect in Progress

While the Disconnect in Progress indicator is displayed:

- TEST and “Other” keys are accepted.
- DISC and COMM keys are ignored.
- DIAL and LOCAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with ‘X–f’ indicator.

Local

The Communication Reminder indicator with the number of ‘599’ is displayed in local mode and:

- COMM, TEST, and “Other” are accepted.
- LOCAL key is ignored.
- DISC and DIAL keys are rejected with Operator Communication Check indicator.
- AID keys are rejected with ‘X–f’ indicator.

X.25 Communication Reminder Indicator

The X.25 Communication Reminder indicator is displayed when the link is closed because of the transmission or receipt of a restart packet. In SVC applications, it is replaced with the Call Ready indicator with C&D codes when the link has been successfully opened. While the Communication Reminder indicator is displayed, all X.25 keys, except LOCAL, are rejected with the Operator Communication Check indicator displayed. The LOCAL key puts the 3174 in local mode.

In PVC connections, the indicator is displayed until the circuit is successfully reopened.

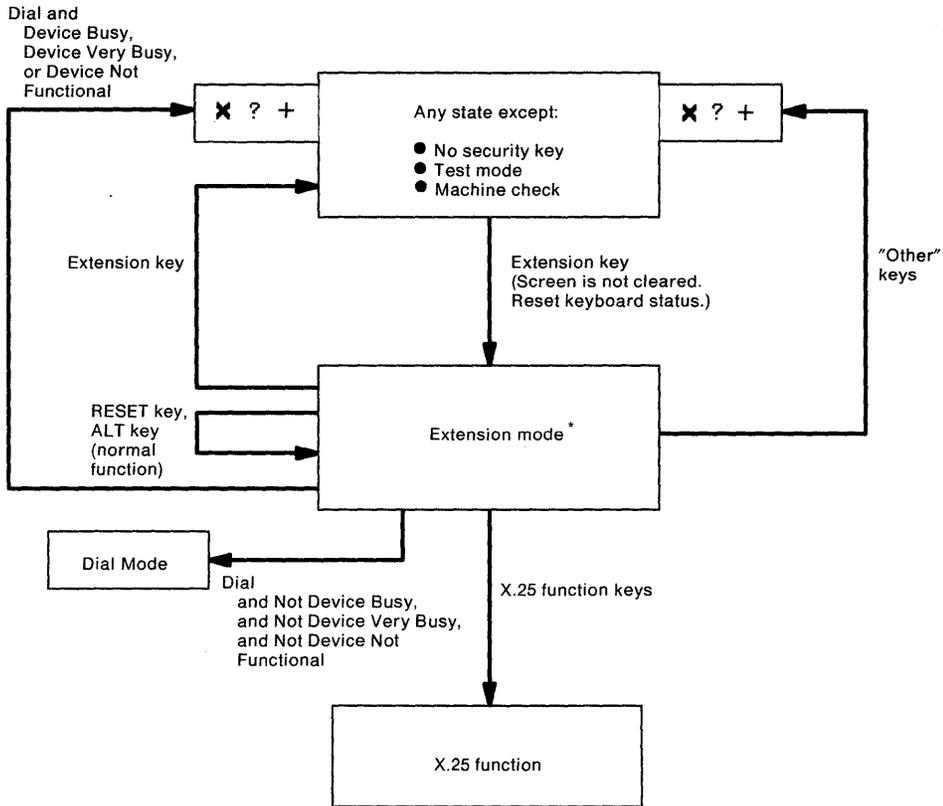
Extension Key

Extension Mode

Extension mode is defined to create additional key functions for X.25 Switched operation on the keyboards of 3178, 3278, 3279, and other compatible attached display stations.

1. Extension mode is entered at any time, except during test mode, a machine check, or a no-security-key condition, by pressing the Extension key.
2. '>' is displayed in the Shifts and Modes area of the operator information area while in extension mode.
3. Pressing the Extension key while in extension mode resets extension mode.
4. The RESET key operates normally in extension mode but does not reset extension mode.
5. The ALT key is treated as a NOP (ignored).
6. While in extension mode at an authorized display station, if any X.25 key other than LOAD MATRIX, ALT, or RESET is pressed, the Retry indicator is displayed and extension mode is reset.
7. When online test 0 (/0) is directed to a terminal in extension mode, extension mode is reset, the terminal enters test mode, and the test is executed.
8. When extension mode is exited, the shift indicators are restored to the state they were in before the Extension key was pressed.
9. Pressing the Extension key is ignored when the terminal is attached to a 3174 port that is not configured to support the Extension key function.

Figure B-3 summarizes extension mode.



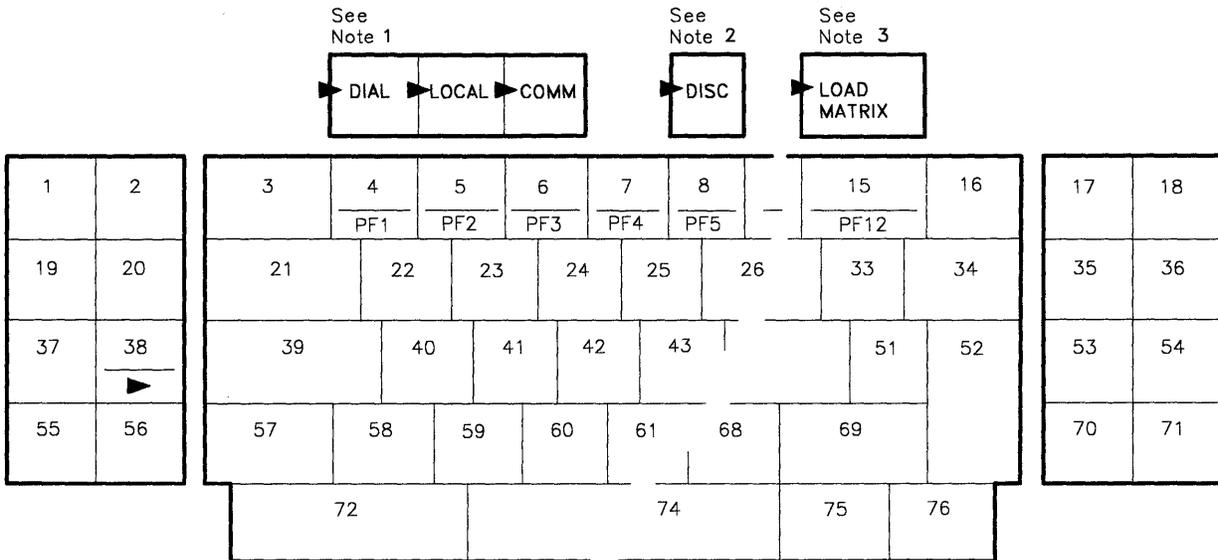
* Indicate  in the shift status field of the operator information area.

Figure B-3. Extension Mode Definition

Extension Key and X.25 Function Keys

Figure B-4 defines key positions for the Extension key and the X.25 function keys.

Note: These key functions are available on attached 3278s, 3279s, and similar display stations. They are not available on distributed function terminals, such as a 3290 Information Panel.



► Label (decals) on keyface identifies Extension key.

Notes:

1. Each of these labels (decals) is applied by the customer to the display station keyboard. The labels are applied as shown next to the key that assumes the corresponding X.25 function following the pressing of the Extension key.
2. The DISC key is separated from the other keys by at least one key space to prevent its being pressed in error.
3. The LOAD MATRIX key function is available only at a display station attached to port 0 of the control unit.

Figure B-4. Extension Key and X.25 Function Keys

Dial Mode Screen

Figure B-5 shows the layout of the display screen when dial mode is entered. The screen displays the dial number and the other facility control fields set to the defaults as selected during configuration (or as overridden by the operator with a previous dial operation).

Any values that require change can be updated by the operator. When the screen contains the correct values, the ENTER key is pressed to initiate appropriate action by the 3174.

A configuration option is provided either to display HNAD only or to display all fields shown below on the dial screen. The default is to display HNAD only.

The cursor is initially positioned in the first character location of the HNAD input field.

X.25 Feature

HNAD	=	@123	123	789	@
CID	=	@A1500000@			
NPKT	=	@1@			
NWND	=	@07@			
RPOA	=	@1898@			
CUG	=	@32@			
QLLC	=	@1@			
TCLS	=	@9@			
DPKT	=	@1@			
DWND	=	@02@			
OOPT	=	@00000000@			
IOPT	=	@00000000@			
I/O	=	@0@			

Figure B-5. Dial Mode Screen

Where: @@ delineates an entry field, the rest of the screen is protected. Entry is validated. If the number or value is invalid, Input Inhibited and Wrong number indicators are displayed and the cursor is positioned in the first character location of the invalid field.

The input fields shown in Figure B-5 are defined as follows:

HNAD

- This 15-character field contains the host network (DTE) address.
- The initial value of this field is set during the configuration procedure (question 423).

Note: A configuration option is provided to inhibit display of the following fields. If this configuration option is used, the dial mode screen will contain only the HNAD field. Display HNAD field only is the default for the configuration option.

CID

- This field contains the CID (connection identifier or network password).
- Input is validated to be 0–9, A–F, blank, or nulls.
- For security, this is a nondisplay field.
- The value of this field may be preset during the configuration procedure (question 452).

NPKT

- This field contains the packet size to be negotiated toward.
- The value of this field is preset during the configuration procedure (question 430).

NWND

- This field contains the window size to be negotiated toward.
- The value of this field is preset during the configuration procedure (question 432).

RPOA

- This field contains the recognized private operating agency (RPOA) facility ID and is used to select the intermediate network that is to be used between two public networks.
- RPOA may be preset during the configuration procedure (question 442).

CUG

- This field allows the closed user group (CUG) facility to be included in an outgoing Call Request packet.
- CUG may be preset during the configuration procedure (question 441).

QLLC

- This field defines whether QLLC (Qualified Logical Link Control) or PSH (Physical Service Header) logical link control protocols are used. QLLC is to be used by all "new" IBM products with integrated X.25 support. PSH support will allow the 3174 to communicate with "old" X.25 equipment, namely, the equipment attaching to the network through the Network Interface Adapter (NIA) box.
 - 0 = PSH
 - 1 = QLLC
- Logical link control may be preset during the configuration procedure (question 403).

TCLS

- This field defines the Throughput Class value which the 3174 is to use in throughput class negotiation.
- TCLS may be preset during the configuration procedure (question 440).

DPKT

- This field contains the default packet size.
- The value of this field is preset during the configuration procedure (question 434).

DWND

- This field contains the default window size.
- The value of this field is preset during the configuration procedure (question 435).

OOPT

- This field allows the operator to override the outgoing call options selected during the configuration procedure (question 421).
- If the circuit type (question 401) specified during configuration is incoming call only, this field is not displayed.

IOPT

- This field allows the operator to override the incoming call options (question 420) specified during the configuration procedure.
- If the circuit type (question 401) specified during configuration is outgoing call only, this field is not displayed.

I/O

- If the circuit type (question 401) specified during configuration was a two-way call, this input field allows the operator to indicate whether the information on the dial screen should be used (when the ENTER key is pressed) to :
 1. Initiate an outgoing call (value = 0), or
 2. Only store the (changed) values either to allow an incoming call or as future reference for an outgoing call (value = 1).
- If the circuit type (question 401) specified during configuration is incoming call only or outgoing call only, this field is not displayed.

Permanent Virtual Circuit (PVC)

PVC Indicators

An additional indicator is required to convey the network or 3174-supplied cause and diagnostic codes that accompany reset or restart packets. These codes provide the reason for the link's being closed. This indicator is called the X.25 Communication Reminder. When a PVC circuit has been connected, the In Use indicator is displayed in the operator information area.

Note: The operator information area cause codes and diagnostic codes are described under "X.25 Cause and Diagnostic Codes" on page B-24.

PVC Keys

Only two of the keys defined earlier in this appendix, "X.25 SVC States and Key Operations," are provided for PVC connections. They are the LOCAL and COMM keys. Optionally, the function of these keys may be deleted from the 3174 through configuration.

LOCAL Key

The LOCAL key allows a display operator to disconnect the 3174 from the X.25 link. When the LOCAL key is pressed, the 3174 determines whether any SNA sessions are active. The 3174 may have been configured so that, if there are no sessions active, the 3174 will immediately initiate a close-link sequence. If there are SNA sessions active, the Operator Communication Check and Input Inhibited indicators are displayed. If the LOCAL key is pressed a second time without the RESET key being depressed, the close-link sequence is initiated. If the RESET key is pressed to restore the keyboard, two consecutive LOCAL key sequences are required. A configuration option is provided that allows the first depression of the LOCAL key always to perform the close-link sequence. The initiation of a close-link sequence displays the Local indicator.

COMM Key

Pressing the COMM key when in local mode causes the 3174 to display status code 506 (may only be displayed for a split second and not be seen by the operator) and try to reopen the link and circuit. When not in local mode, the COMM key is ignored.

Summary of States and Indicators

Primary Virtual Circuit

Figure B-6 provides a summary of PVC states and indicators.

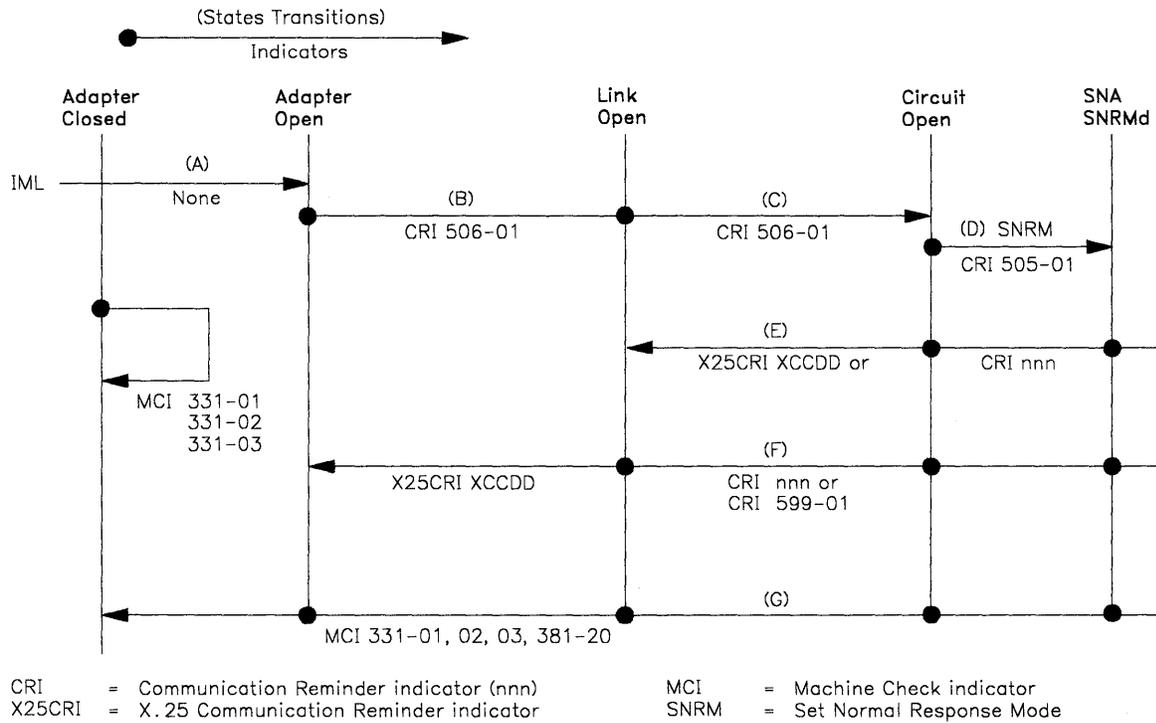


Figure B-6. PVC States and Indicators

Switched Virtual Circuit

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

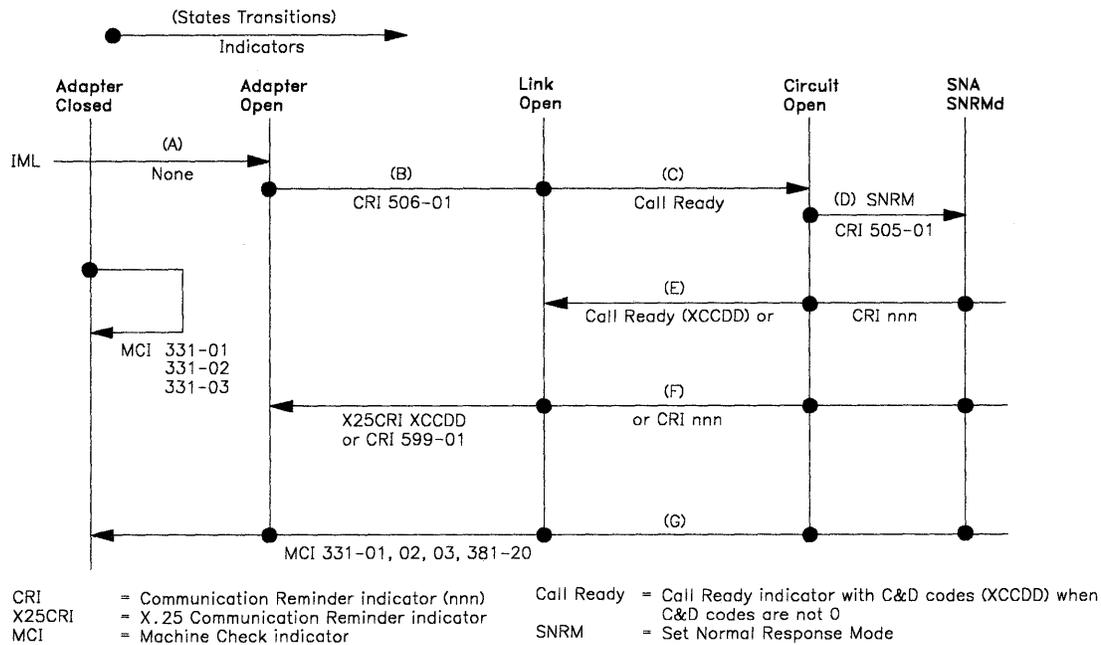


Figure B-7. SVC States and Indicators

X.25 Cause and Diagnostic Codes

This section defines the following X.25 cause and diagnostic codes.

Note: Networks may use their own values for the cause and diagnostic codes. The ones shown in the figures in this section are taken from the November 1980 CCITT recommendation for X.25 networks.

Cause Codes

Clear Indication Packet

Table B-2 lists the cause codes received from data circuit-terminating equipment (DCE) for a Clear Indication packet.

Table B-2. Cause Codes Received from DCE (Clear Packet)	
Hex Code	Meaning
00	DTE-originated ¹
01	Number busy
09	Out of order
11	Remote procedure error
19	Reverse-charging acceptance not subscribed
21	Incompatible destination
29	Fast-select acceptance not subscribed
03	Invalid facility request
0B	Access barred
13	Local procedure error
05	Network congestion
0D	Not obtainable
15	RPOA out of order

¹ When the cause code is X'00', the diagnostic code field has been passed through the network from the remote DTE's original Clear Request. The diagnostic code is then as listed in Table B-6 on page B-27, provided the remote DTE is an IBM (SNA) DTE.

Reset Indication Packet

Table B-3 lists the cause codes received from data circuit-terminating equipment (DCE) for a Reset Indication packet.

Table B-3. Cause Codes Received from DCE (Reset Packet)	
Hex Code	Meaning
00	DTE-originated
01	Out of order ¹
03	Remote procedure error
05	Local procedure error
07	Network congestion
09	Remote DTE operational ²
0F	Network operational ²
11	Incompatible destination

¹ When the cause code is X'00', the diagnostic code field has been passed through the network from the remote DTE's original Clear Request, Reset Request, or Restart Request Packet. The diagnostic code is then as listed in Table B-6 on page B-27, provided the remote DTE is an IBM (SNA) DTE.

² Applicable to permanent virtual circuits only.

Restart Indication Packet

Table B-4 lists the cause codes received from data circuit-terminating equipment (DCE) for a Restart Indication packet.

Table B-4. Cause Codes Received from a DCE (Restart Packet)	
Hex Code	Meaning
01	Local procedure error
03	Network Congestion
07	Network operational

Diagnostic Code Modifiers

Table B-5 lists the diagnostic code modifiers.

Table B-5. Diagnostic Code Modifiers	
Hex Code	Meaning
00	No additional information provided. See diagnostic code.
01	Calling DTE address is expected, but none is included.
02	Calling DTE address does not match configured value.
03	Facilities other than RPOA are included when configuring indicates that none is expected.
04	Reserved.
05 *	Packet facility is included but is not configured.
06	Incoming CUG does not match configured value.
07	Call requests reverse charging, but the function is not configured.
08	Call requests reverse charging not requested, but the function is not configured.
09 *	Call included window size facility, but the window size facility is not configured.
10	CID is to be validated, but none is included in the Call Request packet.
11	CID is included but does not match the configured value.
12	Protocol ID is not included.
13	Protocol ID is incorrect.
14	CUG facility is configured but is not included in the Call Request packet.
15	Throughput class facility is configured but not included.
16	Reserved.
17	Reverse-charge facility is configured but not included.

* Configured = Either configured value or value entered from the Dial screen.

Diagnostic Codes from DCE

Table B-6 lists the diagnostic code fields received from data circuit-terminating equipment (DCE).

Table B-6. Diagnostic Code Fields Received from DCE	
Hex Code	Meaning
00	No additional information
01	Invalid P(S)
02	Invalid P(R)
10	Packet type invalid — general
	For state:
11	R1
12	R2
13	R3
14	P1
15	P2
16	P3
17	P4
18	P5
19	P6
1A	P7
1B	D1
1C	D2
1D	D3
20	Packet not allowed — general
21	Unidentifiable
22	Call on one-way logical channel
23	Invalid packet type on PVC
24	Packet on unassigned logical channel
25	Reject not subscribed to
26	Packet too short
27	Packet too long
28	Invalid GFI
29	Restart with nonzero GFI
2A	Packet type incompatible with facility
2B	Unauthorized interrupt confirmation
2C	Unauthorized interrupt
30	Timer expired — general
31	Incoming call
32	Clear indication
33	Reset indication
34	Restart indication
40	Call setup problem — general
41	Facility code not allowed
42	Facility parameter not allowed
43	Invalid called — address
44	Invalid calling — address
50	Call clearing problem — general
51	Nonzero address lengths field
52	Nonzero facility lengths field

Diagnostic Codes from DTE

Table B-7 lists the diagnostic code fields generated by IBM (SNA) data terminal equipment (DTE). The 3174 uses this list of diagnostic codes regardless of the type of circuit.

Table B-7 (Page 1 of 2). Diagnostic Code Fields Generated by IBM (SNA) DTE	
Hex Code	Meaning
00	Normal initialization or termination
0C	Invalid LLC type
10	Invalid Packet type — general
	For state:
11	R1
12	R2
13	R3
14	P1
15	P2
16	P3
17	P4
18	P5
19	P6
1A	P7
1B	D1
1C	D2
1D	D3
20	DCE timer expired — general
21	Incoming call
22	Clear indication
23	Reset indication
24	Restart indication
30	DTE timer expired — general
31	Call request
32	Clear request
33	Reset request
34	Restart request
50	QLLC error — general
51	Undefined C-field
52	Unexpected C-field
53	Missing I-field
54	Undefined I-field
55	I-field too long
56	QFRMR received
57	Invalid QLLC header
58	Data received in non-data state
59	Timeout condition
60	PSH error — general
61	Sequence error
62	PS header too short
63	PSH format invalid
64	Command undefined
65	Invalid PSH protocol
66	Data received in non-data state
69	Timeout condition
A0	Packet not allowed

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

Hex Code	Meaning
A1	Invalid M-bit packet sequence
A2	Invalid packet type received
A3	Invalid packet on PVC
A4	Unassigned logical channel number
A5	Diagnostic packet received
A6	Packet too short
A7	Packet too long
A8	Invalid GFI
A9	Not identifiable
AA	Not supported
AB	Invalid P(S)
AC	Invalid P(R)
AD	Invalid D bit received
AE	Invalid Q bit received
	3174—specific codes (see Note)
C1	Termination pending
C2	Channel inoperative
C3	Unauthorized interrupt confirmation
C4	Unauthorized interrupt request
C5	PVC resource not available
D0	Resources — general
D1	Buffers depleted
D2	PIU too long
E0	Local procedure error — general
E1	Packet received with LC not equal to 0
E2	Restart or Diagnostic packet received with LC not equal to 0
E3	Incoming call received on wrong LC
E4	Facility not subscribed
E5	Invalid packet for LC equal to 0
E6	Facility parameters not supported
E7	Facility not supported
E8	Unexpected calling DTE
E9	Invalid D bit received
EA	Reset indication on virtual call
EB	Invalid protocol identifier
EC	Connection identifier mismatch
F0	Remote procedure error—general

Appendix C. X.21 Feature

X.21 Functional Description	C-2
X.21 Switched Microcode Function	C-3
Function Requests	C-3
Call Collision	C-5
Call Progress (CP) Signals	C-5
Data Link Control Function	C-5
Call Ready	C-6
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-9
Call Progress Signal Code	C-10
X.21 Error Completion Modifier Bits	C-10

X.21 Feature

The Type 2 Communication Adapter or the Type 2 Concurrent Communication Adapter in the 3174 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, and 48 000, and 64 000bps.

To use the X.21 Switched feature, the 3174 must have either a 3278, 3279, or similar display station attached.

X.21 Functional Description

The 3174 supports the following X.21 functions:

- SDLC microcode to support X.21 Switched protocol
- Data link control, which is an interface to the SDLC microcode
- X.21 Switched adapter (Type 2 Communication Adapter).

The data link control issues function requests to the microcode and handles completion codes from the microcode. Figure C-1 on page C-3 outlines the data link control function.

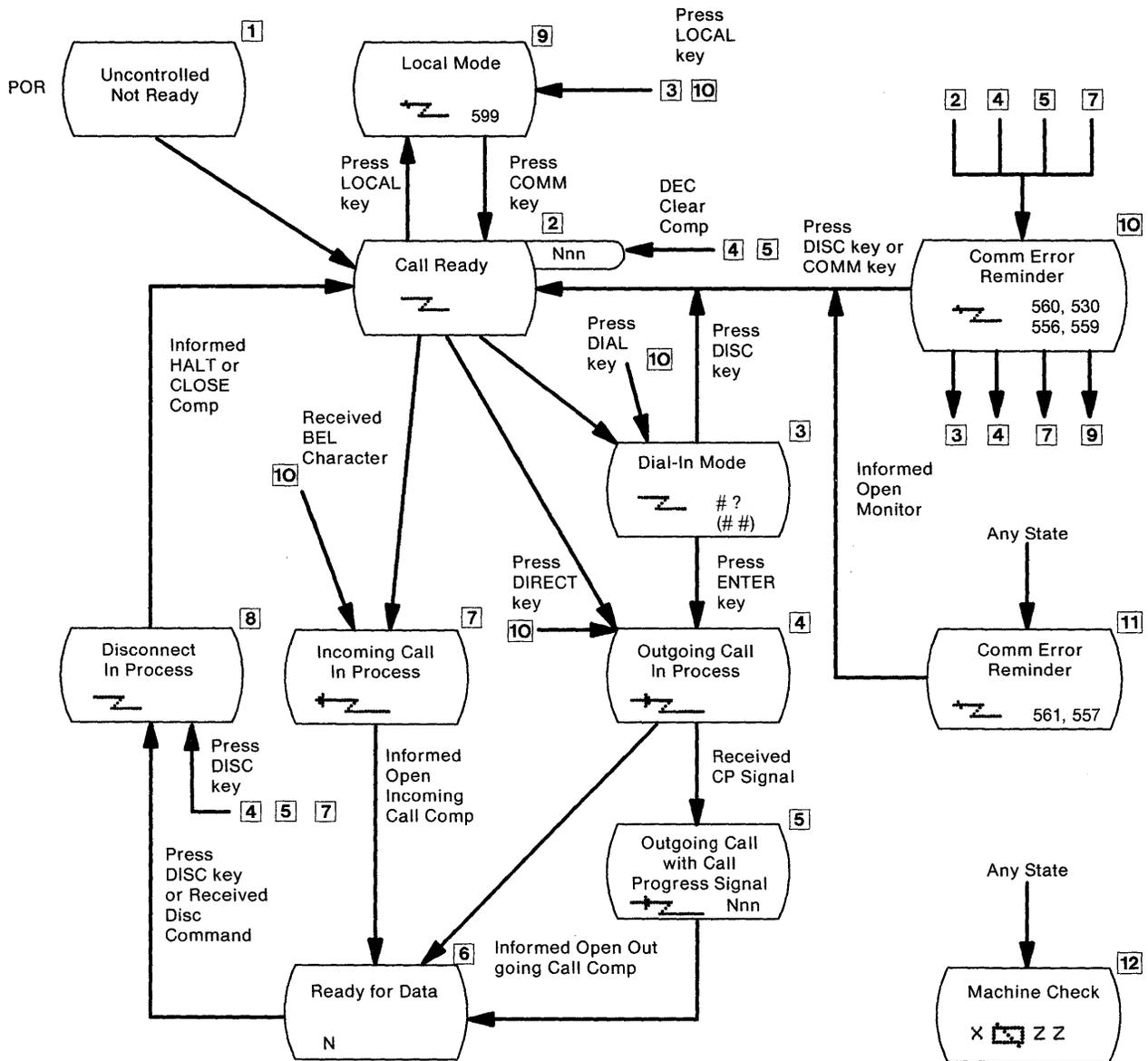


Figure C-1. Data Link Control Function

X.21 Switched Microcode Function

Function Requests

1. OPEN for outgoing call.

By this request, the HPCA and the X.21 hardware are reset and enabled. After passing through the ready state, they proceed with the outgoing call establishment.

The microcode signals the X.21 hardware to enter the call-request state and awaits the reception of an IA5 plus (+) character from the network.

When the request contains selection signals, the microcode/X.21 hardware sends two IA5 sync characters and the selection signals (including 'dial digits') that were set up by the data link control in the selection signal buffer.

The X.21 hardware monitors the network interface; if 'call progress' signals and/or called line identification are received, they are passed on to the microcode. After translation, the microcode will

pass the first 'call progress' signal (normally two digits) or line ID to the data link control's buffer and posts an intermediate completion status.

When the microcode detects that the network is ready for data, the microcode will enter the data-transfer phase after housekeeping and preparing the X.21 hardware and microcode to receive the first SDLC frame. The data link control is notified that the Open is completed.

The process is similar when outgoing call is direct. A direct call by the data link control identifies a direct call by specifying no dial digits. When the IA5 plus (+) character is received, signifying select from the network, the microcode enters the DTE waiting state for the reception of 'call progress' signals, called line identification (or the indication that the network is ready for data).

2. OPEN for incoming call.

When the data link control issues the X.21 Open function request for an incoming call, the action of the microcode/X.21 hardware differs slightly from that for an outgoing call.

- The microcode/X.21 hardware determines that the network is ready, then enters the ready state to wait for an interrupt from the X.21 hardware signifying activity on the network.
- Receipt of one IA5 BEL character identifies the incoming call state. The microcode posts an intermediate completion status (BEL RCVD) and, when it regains control, prompts the X.21 hardware to turn on the control lead that signifies the call-accepted state.
- The microcode now waits for an interrupt to indicate either that the calling line identification has been received or that the network is ready for data. If line identification is received, the microcode moves it to the data link control's buffer, and the completion status is passed on in the same way as for an outgoing call.

When the ready-for-data condition is detected, the data-transfer phase is entered after the microcode completes appropriate housekeeping and prepares the X.21 hardware for the first SDLC frame. A normal completion to the Open function request is posted by the microcode.

3. Open for monitoring

The microcode checks the X.21 interface periodically. If the DCE's status coincides with the condition specified by the data link control, that is, DCE ready or DCE not ready, the microcode reports normal completion.

4. Close

If the clearing sequence is already completed, the microcode merely executes the final housekeeping requirements; otherwise, the microcode starts a clearing sequence. When the clearing sequence ends properly, and no comparator error is indicated by the X.21 hardware, a normal completion is posted. When the clearing sequence does not end properly within its time limit, or if a comparator error exists, appropriate error status is posted. The HPCA and the X.21 hardware are always reset prior to posting any completion code to the Close FR. The microcode/X.21 hardware will be in the controlled-not-ready state when this FR ends.

5. HALT

The data link control aborts an Open function request by issuing a HALT request. The microcode executes a clearing sequence to the network.

Call Collision

A call-collision condition can exist when a call request is made to the network at the same time the network is making an incoming call. The network will resolve the collision in favor of the call request.

Note: The X.21 recommendation does not permit deliberate call collisions; that is, the DTE entering the call-request state after becoming aware of the incoming-call state.

Therefore, the data link control avoids deliberate situations by issuing the proper sequence of function requests; for example, by issuing a HALT request to the Open for Incoming request before issuing the Open for Outgoing request.

Call Progress (CP) Signals

The only time the microcode is affected by a particular 'call progress' (CP) signal is if the first digit of a received CP signal is an IA5 0, 2, or 6.

The IA5 0 identifies the call-wait class (terminal called or waiting connection). The action of the microcode upon detecting the (IA5 0) is to initiate a 60-second timeout, instead of the 2-second timeout, while waiting for the network to become ready for data. Upon detecting the IA5 2 or 6 (short-term condition when clearing), the microcode prepares for the retry by initiating a clearing sequence. CP signals already received will be moved to the data link control's buffer.

When reacting to an IA5 '0' CP, the microcode will post the intermediate completion status, indicating that CP signals are available in the buffer. When reacting to the IA5'2' or '6' CP, the retry intermediate status is posted, indicating the retry is due to receipt of a retry type CP signal.

Data Link Control Function

Call Ready

The Call Ready indicator is displayed in the operator information area of the 3278 or 3279, and the use of either the DIAL key or the LOCAL key is accepted, as is an incoming call.

This state is the *X.21 ready* state and is entered by the Open for Incoming request to the microcode under the following conditions:

1. Immediately after the 3174 is powered on by the uncontrolled-not-ready state.
2. When the COMM key is pressed while operating in the local mode.
3. When the dial-in mode is ended by the DISC key.
4. After the line is disconnected normally by the DISC key on the DISC command.
5. When the Open Outgoing request is rejected by CP signals.
6. After the line is disconnected by an error, or after the X.21 open request is completed erroneously, except if condition 7 exists. (The Call Ready indicator is overridden by the communication error reminder. This reminder can be reset by the COMM key, and the Call Ready indicator will appear.)
7. If the DCE is not ready, the communication error reminder is displayed, and the Open Monitor request is issued. When this request is completed, the Call Ready indicator is displayed in the operator information area.

X.21 Feature

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 the Incoming Call in Progress indicator is displayed and returns control to the microcode. When the Ready for Data is sent from the DCE, the microcode returns a normal completion code. The data link control turns off the Incoming Call in Progress indicator, turns on the In Use indicator, and prepares for normal data exchange.

Dialing

When the DIAL key is pressed in the call-ready state, the data link control issues the HALT request to the microcode to inhibit an incoming call, clears the screen, and puts the cursor at the home position. The Wait indicator is displayed until the HALT request is completed. Then the Dial In indicator is displayed.

The operator enters dial digits, or any facility request allowed by the network, and presses the ENTER key.

The data link control issues an Open for Outgoing request to the microcode with parameters that include selection signals entered by the operator, and the Outgoing Call in Progress is displayed indicator.

Direct Call

When the DIRECT key is pressed in the call-ready state, the data link control issues the HALT request and the Open for Outgoing request, with no selection signal, and the Outgoing Call in Progress indicator is displayed.

Outgoing Call in Progress

The microcode processes the Open-for-Outgoing request, as described under "X.21 Switched Microcode Function" on page C-3, and returns a normal completion code to the data link control when the X.21 'ready for data' signal is sent from the DCE. The data link control turns off the Outgoing Call in Progress indicator, turns on the In Use indicator, and prepares for normal data exchange.

Local Mode

When the LOCAL key is pressed in the call-ready state, the data link control issues the HALT request and the Local Mode indicator is displayed.

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 the Call Ready indicator is displayed.

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 the Disconnect in Progress indicator is displayed. 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 Call Read is displayed 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 the Call-Ready indicator is displayed.

The line is also disconnected automatically by a timeout condition or by the SDLC DISC command.

Status and Key Operation

Figure C-2 and Figure C-3 on page C-8 show how keys are treated when pressed in the X.21 Switched states and when in the dial-in mode.

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		Accept	X 1 →Z →Z	Ignore →Z	→Z
Outgoing Call In Process with Call Progress Signal	X 1 →Z →Z		Accept	X 1 →Z →Z	Ignore →Z	→Z
Incoming Call In Process	X 1 →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)

A.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

Call Progress Signal Code

The 'call progress' (CP) signal is sent by the network to advise a calling terminal/host about the progress of a call or about the circumstances that have prevented a connection from being established. It is transmitted by the network after receiving end-of-dialing and is not repeated. The 'call progress' codes and meanings are shown in Table C-1.

Note: The meaning of the codes is different in each country. Ask a specialist for details about code meanings.

Table C-1. Call Progress Signal Code	
CPS Code	CPS Meaning
00	Wait
01	Terminal called
02	Redirected call
03	Connect when free
20	Number busy
21	Busy
22	Procedure error
23	Selection signal transmission error
41	Access barred
42	Changed number
43	Not obtainable
44	Out of order
45	Controlled not ready
46	Uncontrolled not ready
47	DCE power off
48	Invalid facility request
49	Network fault in local loop
51	Call information service
52	Incompatible user class of service
61	Network congestion
71	Long-term network congestion
72	RPOA out of order
81	Registration/cancellation confirmed.

X.21 Error Completion Modifier Bits

Table C-2 shows the meanings of the error completion modifier bits for an X.21 communication failure.

Table C-2. X.21 Error Completion Modifier Bits		
Byte	Bit	Description
B1	0	Reserved.
	1	Reserved.
	2	The T1 (3-second) timer expired, indicating that the microcode did not receive the 'proceed to select' state in response to signaling a call request.
	3	The T2 (20-second) timer has expired, indicating that on an outgoing call, neither a call progress signal nor 'ready for data' is detected after the selection signals are sent.
	4	The T5 or T6 (2-second) timer has expired, indicating that the DTE did not detect the DCE ready state in response to a DTE clear request or DTE clear confirmation.
	5	The T3A (2-second) timer has expired, indicating that ready for data is not detected after call progress signals are received and the calling DTE has not been told to wait 60 seconds. The T3B (60-second) timer has expired after a call progress signal was received, telling the calling DTE to wait 60 seconds for the "ready for data state" to be signaled (manual answer).
	6	The T4 timer (2-seconds) has occurred during an incoming call when 'ready for data' is not detected after the microcode has signaled call accepted.
	7	Reserved.

List of Abbreviations

A

- A.** (1) Ampere. (2) Attention.
- AC.** Alternating current.
- ACK.** Acknowledge.
- ACTLU.** Activate Logical Unit.
- ACTPU.** Activate Physical Unit.
- AEA.** Asynchronous Emulation Adapter.
- AID.** Attention identifier.
- Alt.** Alternate.
- A/N.** Alphanumeric.
- APL.** A Programming Language.
- ASCII.** American National Standard Code for Information Interchange.
- ATTN.** Attention.

B

- B.** Busy.
- bps.** Bits per second.
- BSC.** Binary synchronous communication.

C

- C.** Celsius.
- C&D.** Cause and diagnostic (codes).
- CAD.** Computer-Aided Design.
- CCITT.** International Telegraph and Telephone Consultative Committee.
- CD.** Change direction.
- CE.** (1) IBM Customer Engineer. (2) Correctable error. (3) Channel-end.
- CECP.** Country extended code page.
- CEM.** Customer Engineering Memorandum

- CHIO.** Channel input output.
- CID.** Connection identifier.
- coax.** Coaxial (cable).
- comm.** Communication.
- cont.** Continuous.
- cps.** Characters per second.
- CR.** (1) Command Reject. (2) Carriage return.
- CRT.** Cathode-ray tube.

- CSCM.** Central Site Change Management.
- CSU.** Customer setup.
- CTL.** Control.
- ctr.** Counter.
- CTS.** Clear to Send.
- CU.** Control unit.

- CUG.** Closed user group.
- CUT.** Control unit terminal.

D

- D.** Display.
- dBa.** Adjusted decibels.
- DC.** Direct current.
- DCE.** Data-circuit-terminating equipment.
- DE.** Device-end.
- DES.** Data Encryption Standard.
- DFT.** (1) Distributed function terminal. (2) Diagnostic function test.
- DISC.** Disconnect.
- DM.** (1) Disconnect mode. (2) Distribution Manager
- DOS.** Disk Operating System.
- DPC.** Dual-purpose connector.

DPKT. Default packet size.

DPPX. Distributed Processing Programming Executive.

Dsk. Diskette.

DSL. (1) Downstream load. (2) Data set label.

DSR. Data set ready.

DTE. Data terminal equipment.

DTR. Data terminal ready.

DWND. Default window size.

E

EB. End bracket.

EBCDIC. Extended binary-coded decimal interchange code.

EC. Engineering change.

ECC. Error-checking and correction.

ECMA. European Computer Manufacturers' Association.

EIA. Electronic Industries Association.

ERP. Error recovery procedures.

ESC. Escape.

ESD. Electrostatic discharge

F

F. Fahrenheit.

FCC. Federal Communications Commission.

FCS. Frame checking sequence.

FF. Forms feed.

FMD. (1) Function management data. (2) Field macro diagram.

FP. Faceplate.

FRMR. Frame reject response.

FRU. Field-replaceable unit.

G

GFI. General format identifier.

H

hex. Hexadecimal.

HNAD. Host network (DTE) address.

HPCA. High-performance communication adapter.

I

I. Information (format).

ID. Identification, identifier.

IEEE. Institute of Electrical and Electronic Engineers.

IML. Initial microcode load.

in. Inch (or inches).

ind. Indicator.

I/O. Input/output.

IOPT. Incoming call option.

IR. Intervention Required.

K

k. 1000.

K. 1024.

L

LAPB. Link access procedure balanced.

LC. Logical channel.

LCID. Logical channel identifier.

LED. Light-emitting diode.

LLC. Logical link control.

LT. Logical terminal.

LU. Logical unit.

M

m. Meter (or meters).

MAC. (1) Medium access control. (2) Message authentication code.

MAP. Maintenance analysis procedure.

max. Maximum.

MB. Megabyte; 1 048 576 bytes.

MDT. Modified data tag.

MLT. Multiple logical terminals.

mm. Millimeter (or millimeters).

MMIO. Memory-mapped input output.

modem. Modulator-demodulator.

MSR. Magnetic stripe reader.

MVS. Multiple virtual storage.

N

NCP. Network Control Program.

NIA. Network Interface Adapter.

NMVT. Network Management Vector Transport.

No. Number.

NOP. No operation.

NPKT. Negotiated packet size.

NRZ. Nonreturn to zero.

NS. Nonsequenced (format).

NTT. Nippon Telephone and Telegraph.

NUM. Numeric.

NWND. Negotiated window size.

O

OIA. Operator information area.

OOPT. Outgoing call option.

P

PA. (1) Program access. (2) Program attention.

PAM. Printer authorization matrix.

PBX. Private branch exchange.

PC. Personal Computer.

pF. Picofarad.

PF. Program function.

PIO. Programmable input output.

PIU. Path information unit.

POST. Power-On Self Test.

PS. Programmed symbols.

PSDN. Packet switched data network.

PSH. Physical services header.

PT. Program Tab.

PU. Physical unit

PUID. Physical unit identification.

PVC. Permanent virtual circuit.

Q

QFRMR. Qualified frame reject response.

QLLC. Qualified logical link control.

QSM. Qualified set mode.

R

rel. Relative.

Req. Request.

RNR. Request not ready, receive not ready.

ROS. Read-only storage.

RPOA. Recognized private operating agency.

RPQ. Request for price quotation.

RR. Request ready, receive ready.

RTM. Response Time Monitor.

RTS. Request to send.

RU. Request/response unit.

S

S. Sequenced (format), side.

SABME. Set Asynchronous Balance Mode Extended (command).

SAP. Service access point.

SBA. Set Buffer Address.

SC. Status code.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

SM. Status modifier.

SNA. Systems Network Architecture.

SNRM. Set Normal Response Mode.

SSCP. System services control point.

SVC. Switched virtual circuit.

SYSGEN. System generation.

T

TA. Terminal adapter.

TCLS. Throughput class negotiation.

TMA. Terminal multiplexer adapter.

TP. Teleprocessing.

TSR. Transistor switching regulator.

U

U. Unprotected.

UA. Unnumbered acknowledgment.

U.S. United States.

V

V. Volt.

Vac. Volts alternating current.

W

WCC. Write control character.

WSF. Write Structured Field.

WT. World Trade.

Glossary

This glossary includes terms and definitions from the *IBM Dictionary of Computing: Information Processing, Personal Computing, Telecommunications, Office Systems, IBM-specific Terms*, SC20-1699.

The terms in this glossary are defined here as they apply to the 3270 Information Display System.

A

access procedure. In a local area network (LAN), the procedure or protocol that is used to gain access to the transmission medium.

Note: The medium access procedures specified by the IEEE 802 standard are CSMA/CD token, bus, and ring.

access unit. In an IBM Token-Ring Network, a wiring concentrator. See *multistation access unit*.

acknowledgment. The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender.

active. Able to communicate on the network. An adapter is active if it is able to pass tokens on the network.

active logical terminal (LT). In MLT, the currently displayed logical terminal. Synonymous with *foreground logical terminal*. Contrast with *background logical terminal*.

active monitor. A function in a single adapter on a ring network that initiates the transmission of tokens and provides token error recovery facilities. Any active adapter on the ring has the ability to provide the active monitor function if the current active monitor fails.

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

address. (1) A value that identifies a register, a particular part of storage, a data source, or a data sink. The value is represented by one or more characters. (2) To refer to a device or an item of data by its address. (3) In word processing, the location, identified by an address code, of a specific section of the recording medium or storage. (4) The location in the storage of a computer where data is stored. (5) In data communication, the unique code assigned to each device or work station connected to a network.

AEA port. A communication connector on the Asynchronous Emulation Adapter (AEA).

alert. (1) In the IBM Token-Ring Network Manager, a notification appearing on the bottom line of any panel to indicate an interruption or a potential interruption in the flow of data around the ring. (2) In NetView, a notification about a high-priority event that warrants immediate attention. This data-base record is generated for certain event types that are defined by user-constructed filters.

alternate 1 initial microcode load (Alt 1 IML). The action of loading the Utility microcode.

American National Standard Code for Information Interchange (ASCII). A standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

application. The use to which an information processing system is put, for example, a payroll application, an airline reservation application, or a network application.

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

ASCII emulation. The ability of a 3270 display station or printer to communicate with an ASCII host using the DEC VT100 or IBM 3101 data stream.

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

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

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

attaching device. Any device that is physically connected to a network and can communicate over the network.

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

attention (ATTN). An occurrence external to an operation that could cause an interruption of the operation.

attention identifier (AID). (1) A code in the inbound 3270 data stream that identifies the source or type of data that follows. (2) A character in a data stream indicating that the user has pressed a key, such as Enter, that requests an action by the system.

attribute. (1) A characteristic. (2) A terminal display language or transformation definition language (TDL) keyword that specifies a particular quality for the TDL object with which it is associated.

attribute select keyboard. A keyboard that enables the operator, when permitted by the program, to change the character attributes of the keyed-in character.

audible alarm. (1) An alarm that is sounded when designated events occur that require operator attention or intervention before system operation can continue. (2) A special feature that sounds a short, audible tone automatically when a character is entered from the keyboard into the next-to-last character position on the screen. The tone can also be sounded under program control.

auto-answer. See *automatic answering*.

auto-call. See *automatic calling*.

automatic answering. (1) Answering in which the called data terminal equipment (DTE) automatically responds to the calling signal.

Note: The call may be established whether or not the called DTE is attended.

(2) A machine feature that permits a station to respond without operator action to a call it receives over a switched line. See also *manual answering*. Contrast with *automatic calling*.

automatic calling. (1) Calling in which the elements of the selection signal are entered into the data network contiguously at the full data signaling rate. (2) A machine feature that permits a station to initiate a connection with another station over a switched line without operator action. (3) Synonymous with auto-call. See also *manual calling*. Contrast with *automatic answering*.

B

backbone. In a multiple-ring local area network, a high-speed link to which the rings are connected by means of bridges. A backbone may be configured as a bus or as a ring.

background logical terminal (LT). In MLT, any logical terminal that is not currently displayed. Contrast with *active logical terminal (LT)*.

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

base color. The capability of displaying or printing all characters in a field, in one of four colors, on a color terminal by use of combinations of the field protection and the field intensify bits of the field attribute.

beacon. Synonym for *beacon message*.

beacon frame. Synonym for *beacon message*.

beacon message. A frame or message repeatedly transmitted by a station on detection of a line break or outage. Transmission of beacon messages stops when the fault is bypassed or eliminated. Synonymous with *beacon* and *beacon frame*.

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

blink. An extended highlighting attribute value (for emphasis) of a field or character.

bracket. In SNA, one or more chains of request units (RUs) and their responses, which are exchanged between two LU-LU half-sessions and represent a transaction between them. A bracket must be completed before another bracket can be started. Examples of brackets are data base inquiries/replies, update transactions, and remote job entry output sequences to work stations.

bridge. (1) A functional unit that connects two local area networks (LANs) that use the same logical link control (LLC) procedure but may use different medium access control (MAC) procedures. (2) See also *backbone* and *gateway*.

Note: A bridge connects networks or systems of the same or similar architectures, whereas a gateway connects networks or systems of different architectures.

buffer. (1) A routine or storage used to compensate for a difference in rate of flow of data, or time of

occurrence of events, when transferring data from one device to another. (2) An isolating circuit used to prevent a driven circuit from influencing the driving circuit. (3) To allocate and schedule the use of buffers. (4) A portion of storage used to hold input or output temporarily.

buffer address. The address of a location in the buffer.

burst. (1) In data communication, a sequence of signals counted as one unit in accordance with some specific criterion or measure. (2) To separate continuous-form paper into discrete sheets.

bus. A type of network topology where the network consists of a bidirectional communication path with defined end points.

bypass. To eliminate an attaching device or an access unit from a ring network by allowing the data to flow in a path around it.

C

card. In the 3174 Establishment Controller, a unit of electronic circuitry contained in a plastic casing (or cassette) and providing the controller with a specialized function, for example, a Terminal Adapter or an Encrypt/Decrypt Adapter.

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

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

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

channel-attached. Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. Synonym for *local*. Contrast with *telecommunication-attached*.

channel-to-channel adapter. A hardware device that can be used to connect two channels on the same computing system or on different systems.

character set. (1) A defined collection of characters. (2) A group of characters used for a specific reason, for example, the set of characters a printer can print. (3) The collection of graphic characters required to support a specific language.

Clear to Send (CTS) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the CTS lead on an EIA 232D interface.

cluster. A station that consists of a control unit (a cluster controller) and the terminals attached to it.

cluster controller. A device that can control the input/output operations of more than one device connected to it. A cluster controller may be controlled by a program stored and executed in the unit, for example, the IBM 3601 Finance Communication Controller. Or, it may be entirely controlled by hardware, for example, the IBM 3272 Control Unit. See also *cluster* and *cluster controller node*. Synonymous with *cluster control unit*.

cluster controller node. A peripheral node that can control a variety of devices. See also *host node*, *Network Control Program (NCP) node*, and *terminal node*.

cluster control unit. Synonym for cluster controller.

coaxial cable. A cable consisting of one conductor, usually a small copper tube or wire, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

code violation. In differential Manchester code encoding, a bit that does not have a state transition at the mid-bit point. See *differential Manchester code*.

command. An instruction that directs a control unit or device to perform an operation or a set of operations.

communication adapter. (1) A circuit card with associated software that enables a processor, controller, or other device to be connected to a network. (2) See *EIA communication adapter*, *V.35 communication adapter*, and *X.21 communication adapter*.

communication controller. (1) A device that directs the transmission of data over the data links of a network; its operation may be controlled by a program processed in a processor to which the controller is connected or by a program executed within the device. (2) A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit. It manages the details of line control and the routing of data through a network. (3) See also *cluster controller*, *communication controller node*, and *transmission control unit*.

communication controller node. A subarea node that does not contain a system services control point (SSCP).

communication control unit. A communication device that controls transmission of data over lines in a network.

completion code. The final return code provided by the adapter as a result of an issued command.

component. (1) Hardware or software that is part of a functional unit. (2) A functional part of an operating system, for example, the scheduler or supervisor. (3) In systems with VSAM, a named, cataloged collection of stored records, such as the data component or index component of a key-sequenced file or alternate index. (4) In System/38 graphics, the representation of a data group on a chart. (5) See *terminal component* and *solid state component*.

configuration. The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term *configuration* may refer to a hardware configuration or a software configuration. See also *system configuration*.

Connection Menu. A menu on the screen of a display station attached to the 3174 Establishment Controller, from which a user can select an available host.

connector. A means of establishing electrical flow.

control block. In the IBM Token-Ring Network, a specifically formatted block of information provided from the application program to the Adapter Support Interface to request an operation.

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

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

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

control function. *Synonym for control operation.*

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

control operation. An action that affects the recording, processing, transmission, or interpretation of data; for

example, starting or stopping a process, carriage return, font change, rewind, and end of transmission. *Synonymous with control function.*

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

control unit terminal (CUT). A terminal that relies on the 3174 to interpret the data stream. Examples are the 3178, 3179, 3278 Model 2, and 3279 Model S2A.

control unit terminal (CUT) mode. A host-interactive mode that enables an IBM 3270 Personal Computer customized in this mode to run only one session emulating a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

conversion. (1) In programming languages, the transformation between values that represent the same data item but belong to different data types. Information may be lost as a result of conversion because accuracy of data representation varies among different data types. (2) The process of changing from one method of data processing to another or from one data processing system to another. (3) The process of changing from one form of representation to another, for example, to change from decimal representation to binary representation.

country extended code page (CECP). A function of the 3174 microcode that provides for a code page containing additional code points beyond those available with Table 5A code pages. CECP is supported by a universal character set, Character Set 697, which contains 190 characters.

create. In 3174 central site customizing, to create a library member for a network controller, and store the customizing data for that library member on a Library diskette.

cursor. (1) A movable, visible mark used to indicate the position at which the next operation will occur on a display surface. (2) A unique symbol that identifies a character position in a screen display, usually the character position at which the next character to be entered from the keyboard will be displayed.

customizing keyboard. A keyboard used to type in the customizing responses; this keyboard must be a Typewriter, Data Entry, APL (with APL off), or Text (with Text off) keyboard with a QWERTY layout. (On a QWERTY layout, the first six characters on the left side of the top row of alphabetic characters are Q, W, E, R, T, Y.)

D

data circuit-terminating equipment (DCE). In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line.

Notes:

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.
2. A DCE may perform other functions that are usually performed at the network end of the line.

Data Entry keyboard. A keyboard layout designed for data entry applications.

data link. Any physical link, such as a wire or a telephone circuit, that connects one or more devices or communication controllers.

data stream. (1) All data transmitted through a data channel in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format. See also *data stream format*.

data stream format. In SNA, the format of the data elements (end-user data) in the request unit (RU). See also *3270 data stream* and *SNA character string (SCS)*.

data terminal equipment (DTE). That part of a data station that serves as a data source, data sink, or both.

Data Terminal Ready (DTR) flow control. A procedure for a communicating device to signal its readiness to receive data by raising the DTR lead on an EIA 232D interface.

data transfer. The movement, or copying, of data from one location and the storage of the data at another location.

data transfer mode. Synonym for *data transfer phase*.

data transfer phase. (1) The phase of a data call during which data signals can be transferred between data terminal equipment (DTEs) connected by the network. (2) Synonymous with *data transfer mode*.

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

default destination. A destination for display stations and printers that is defined in customization.

delimiter. A bit pattern that defines the limits of a frame or token on a ring network.

destination. Any point or location, such as a node, station, or a particular terminal, to which information is to be sent.

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

differential Manchester code. A data-encoding method used by the IBM Token-Ring Network. In this method, a bit has the value of binary 0 if there is a state transition (polarity change) at the beginning of the bit boundary. The bit has the value of binary 1 if there is no transition. In a properly encoded bit, there must always be a transition at every *midpoint* position. If the transition is absent, a code violation results. Since only the presence or absence of the state transition (and not the actual polarity) determines a bit's value, this method of coding is polarity-independent.

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

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

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

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

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

display frame. (1) In computer graphics, an area in storage in which a display image can be recorded. (2) In computer micrographics, an area on a microform in which a display image can be recorded.

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

distributed function terminal (DFT). A programmable terminal that can perform operations previously performed by the control unit. These terminals can interpret the 3270 data stream themselves. Examples are the IBM 3270 Personal Computer and the 3290 Information Panel.

distributed function terminal (DFT) mode. A host-interactive mode that enables an IBM 3270 Information Display System customized in this mode to run as many as four host sessions. The sessions can

emulate a 3178, 3179, 3278 Model 2, or 3279 Model S2A.

downstream. (1) In the direction of data flow or toward the destination of transmission. (2) From the processor toward an attached unit or end user. (3) Contrast with *upstream*.

downstream load (DSL). The capability of a distributed function terminal to receive its control program from the control unit to which it is attached. A diskette containing the terminal's control program is loaded into the control unit.

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

E

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

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

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

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

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

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

extended field attribute. Additional field definition to the field attribute that controls defining additional properties; for example, color, highlighting, character

set, and field validation. The extended field attribute is altered by information passed in the Start Field Extended and Modify Field orders.

F

field. See *display field*.

field attribute. A control character stored in the character buffer in the first character position of a field. For those devices supporting the 3270 data stream, a field attribute defines protected/unprotected, alphanumeric/numeric, detectable/nondetectable, display/nondisplay, intensity, and modified data tag (MDT).

file. A named set of records stored or processed as a unit.

file adapter. In the 3174, an adapter that provides input/output support for external storage devices, such as a diskette drive.

fixed disk. A rigid magnetic disk used in a fixed disk drive.

fixed disk drive. A disk storage device that reads and writes on rigid magnetic disks.

flag. (1) An indicator or parameter that shows the setting of a switch. (2) Any of various types of indicators used for identification, for example, a wordmark. (3) A character that signals the occurrence of some condition, such as the end of a word. (4) Deprecated term for *mark*.

flow control. (1) In data communication, control of the data transfer rate. (2) In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units with minimum congestion in the network, that is, neither to overflow the buffers at the receiver or at intermediate routing nodes nor to leave the receiver waiting for more message units. (3) The methods used to control the flow of information across a network.

foreground logical terminal (LT). Synonym for *active logical terminal (LT)*.

frame. (1) The portion of a tape, on a line perpendicular to the reference edge, on which binary characters can be written or read simultaneously. (2) A housing for machine elements. (3) The hardware support structure, covers, and all electrical parts mounted therein that are packaged as one entity for shipping. (4) A formatted display. See *display frame*.

from diskette. The diskette that provides the data to be transferred.

from drive. The drive that provides the data to be transferred.

full duplex. Synonym for *duplex*.

G

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

Note: A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures.

get. In 3174 central site customizing, to select the type of data you want and store it in working copy.

H

half-duplex. In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

hard error. An error condition on a network that requires that the network be reconfigured or that the source of the error be removed before the ring can resume reliable operation. Contrast with *soft error*.

hertz (Hz). A unit of frequency equal to 1 cycle per second.

hexadecimal. (1) Pertaining to a selection, choice, or condition that has 16 possible values or states. (2) Pertaining to a fixed-radix numeration system, with radix of 16. (3) Pertaining to a numbering system with base of 16; valid numbers use the digits 0 through 9 and characters A through F, where A represents 10 and F represents 15.

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

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

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

host node. (1) A node at which a host processor is located. (2) In SNA, a subarea node that contains a system services control point (SSCP); for example, a System/370 computer with OS/VS2 and ACF/TCAM.

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

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

I

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

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

initial microcode load (IML). The action of loading the operational microcode.

input/output (I/O). (1) Pertaining to a device whose parts can perform an input process and an output process at the same time. (2) Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process. (3) Pertaining to input, output, or both.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, common physical interconnection characteristics, signal characteristics, and other characteristics as appropriate. (2) A shared boundary. An interface may be a hardware component to link two devices or a portion of storage or registers accessed by two or more computer programs. (3) Hardware, software, or both, that links systems, programs, or devices.

J

jack. A connecting device to which a wire or wires of a circuit may be attached and that is arranged for insertion of a plug.

L

leased line. Synonym for *nonswitched line*.

light pen. A light-sensitive pick device that is used by pointing it at the display surface.

Limited Function Utility (LFU) diskette. A diskette that contains the microcode to run only a limited number of utilities. These are: Diagnostics, Copy Files, Encrypt/Decrypt Master Key, and Identify Customizing Keyboard. The Limited Function Utility diskette is used mainly in networks that are under central site control.

line speed. (1) The rate at which data is transmitted from one point to another over a telecommunication line. (2) The number of binary digits that can be sent over a telecommunication line in 1 second, expressed in bits per second (bps).

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

link station. (1) A specific place in a service access point that enables an adapter to communicate with another adapter. (2) A protocol machine in a node that manages the elements of procedure required for the exchange of data traffic with another communicating link station.

lobe. In the IBM Token-Ring Network, the section of cable that attaches a device to an access unit. The cable may consist of several segments.

lobe receptacle. In the IBM Token-Ring Network, an outlet on an access unit for connecting a lobe.

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

location. With reference to a 3174, a place within the 3174 chassis where a particular card or adapter is inserted.

logical terminal (LT). In MLT, one of five sessions available to share one display station.

logical unit (LU). In SNA, a port through which an end user accesses the SNA network in order to communicate with another end user and through which the end user accesses the functions provided by system services control points (SSCPs). An LU can support at least two sessions, one with an SSCP and

one with another LU, and may be capable of supporting many sessions with other logical units.

loop. A closed unidirectional signal path connecting input/output devices to a network.

M

main storage. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent processing.

maintenance analysis procedure (MAP). A maintenance document that gives an IBM service representative a step-by-step procedure for tracing a symptom to the cause of a failure.

manual answering. (1) Answering in which a call is established only if the called user signals a readiness to receive the call by means of a manual operation. (2) Operator actions to prepare a station to receive a call on a switched line. Contrast with *automatic answering*.

manual calling. (1) Calling that permits the entry of selection signals from a calling data station at an undefined character rate. (2) Operator actions to place a call over a switched line. Contrast with *automatic calling*.

mark. A symbol or symbols that indicate the beginning or the end of a field, a word, an item of data or a set of data such as a file, record, or block.

medium access control (MAC) procedure. In a local area network, the part of the protocol that governs access to the transmission medium independently of the physical characteristics of the medium, but taking into account the topological aspects of the network, in order to enable the exchange of data between data stations.

Medium Access Control (MAC) frame. Frames that control the operation of the IBM Token-Ring Network and any ring station operations that affect the ring.

memory. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent execution or processing. Synonymous with *main storage*.

microcode. (1) One or more microinstructions. (2) A code, representing the instructions of an instruction set, that is implemented in a part of storage that is not program-addressable. (3) To design, write, and also to test one or more microinstructions.

modem (modulator/demodulator). A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication

line, and converts the analog signal received to data for the computer.

modified data tag (MDT). A bit in the attribute character of a display field that, when set, causes that field to be transferred to the channel during a read-modified operation. The modified data tag may be set by a keyboard input to the field, a selector-pen detection in the field, a card read-in operation, or program control. The modified data tag may be reset by a selector-pen detection in the field, program control, or ERASE INPUT key.

multidrop (network). A network configuration in which there are one or more intermediate nodes on the path between a central node and an endpoint node.

multiple logical terminal (MLT). In the 3174, a function that provides a CUT-attached, fixed-function display station with the ability to interact with as many as five host sessions. Each session is processed as though it were a separate display station.

multistation access unit. In the IBM Token-Ring Network, a wiring concentrator that can connect up to eight lobes to a ring.

N

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

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

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

network administrator. A person who manages the use and maintenance of a network.

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

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

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

null modem. A device with two 25-pin D-shell connectors that attaches to the station end of a standard, straight-through, pin-for-pin EIA 232D cable. The null modem does the crossing-over of the appropriate EIA 232D leads required for the direct connection of a terminal or computer to an AEA port.

O

offline test. A diagnostic test or data collection program that must be run when the 3174 and its connected terminals are not in normal operation.

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

online test. A diagnostic test or data collection program that is run without interrupting the normal operation of the 3174 and its associated terminals.

open. (1) To make an adapter ready for use. (2) A break in an electrical circuit.

operator information area (OIA). The area below the line near the bottom of the display area where graphics and alphanumeric characters are displayed to define the status of the terminal or the system to the operator.

P

padding. (1) A technique by which a receiving station controls the rate of transmission of a sending station to prevent overrun. (2) In SNA, a technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion.

parallel. (1) Pertaining to a process in which all events occur within the same interval of time, each handled by a separate but similar functional unit; for example, the parallel transmission of the bits of a computer word along the lines of an internal bus. (2) Pertaining to concurrent or simultaneous operation of two or more devices or to concurrent performance of two or more activities in a single device. (3) Pertaining to concurrent or simultaneous occurrence of two or more related activities in multiple devices or channels. (4) Pertaining to the simultaneity of two or more processes. (5) Pertaining to the simultaneous processing of the individual parts of a whole, such as the bits of a character and the characters of a word, using separate facilities for the various parts. (6) Contrast with *serial*.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (2) An item in a menu for which the user specifies a value or for which the system provides

a value when the menu is interpreted. (3) Data passed between programs or procedures.

parity. (1) A transmission error-checking scheme in which an extra bit is added to some unit of data, usually a byte, in order to make the total number of one bits even or odd. For the AEA feature, odd, even, mark, space, or no-parity coding is supported. No-parity means that no parity bit is sent or expected. Mark and space mean that the parity position is always set to one or zero, respectively, and that received parity is not checked. (2) The state of being either even-numbered or odd-numbered.

path. In a network, a route between any two nodes.

physical unit (PU). In SNA, the component that manages and monitors the resources (such as attached links and adjacent link stations) of a node, as requested by an SSCP through an SSCP-SSCP session.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached.

Power-On Self-Test (POST). A series of diagnostic tests that are run each time the computer's power is turned on.

printer authorization matrix (PAM). A matrix stored in the controller that establishes printer assignment and classification.

private branch exchange (PBX). An automatic or manual private telephone exchange for transmission of calls to and from the public telephone network.

program access (PA) key. On a display device keyboard, a key that produces a call to a program that performs display operations. See also *program function (PF) key*.

program function (PF) key. On a display device keyboard, a key that passes a signal to a program to call for a particular display operation. See also *program access (PA) key*.

programmable symbols (PS). Customer-defined symbols. There are a maximum of 190 symbols in a programmed symbol set.

programmed symbols (PS). In the 3270 Information Display System, an optional feature that stores up to six user-definable, program-loadable character sets of 190 characters each in terminal read/write storage for display or printing by the terminal.

Program Tab (PT) order. An order that advances the current buffer address to the address of the first character location of the next unprotected field and resets the character attributes of all characters in the field that are replaced by nulls.

protected field. (1) In word processing, preset data or an area that cannot be changed or overridden by an operator without altering the program. (2) On a display device, a display field in which a user cannot enter, modify, or erase data. Contrast with *unprotected field*.

protocol. (1) A set of semantic and syntactic rules that determine the behavior of functional units in achieving communication. (2) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

protocol conversion. For the AEA feature, emulation of one device protocol by a device designed for a different protocol.

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

R

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

receptacle. See *lobe receptacle*.

register. A storage device having a specified storage capacity such as a bit, byte, or computer word, and usually intended for a special purpose.

remote. Pertaining to a system, program, or device that is accessed through a telecommunication line.

request for price quotation (RPQ). An alteration or addition to the functional capabilities that the controller provides.

Response Time Monitor (RTM). A network management tool that measures and records the transaction times of inbound host attention (AID) operations from display stations that communicate with the host.

return code. (1) A code used to influence the execution of succeeding instructions. (2) A value returned to a program to indicate the results of an operation requested by that program.

Ring Diagnostic. In the IBM Token-Ring Network, a program to be run in an IBM Personal Computer that provides the user information regarding the performance of the ring.

ring in. In the IBM Token-Ring Network, the receive or input receptacle on an access unit. Contrast with *ring out*.

ring interface adapter. A device that assumes the basic data transmission functions of node, such as frame recognition, address decoding, error checking, buffering of frames, fault detection, and, in Token-Ring Networks, token generation.

ring network. A network configuration where a series of attaching devices are connected by unidirectional transmission links to form a closed path.

ring out. In the IBM Token-Ring Network, the transmit or output receptacle. Contrast with *ring in*.

ring status. The condition of the ring.

routing. (1) The assignment of the path by which a message will reach its destination. (2) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

S

segment. A section of cable between components or devices on the network. A segment may consist of a single patch cable, multiple patch cables connected, or a combination of building cable and patch cables connected.

selector pen. A pen-like instrument that can be attached to a display station. When a program using full-screen processing is assigned to the display station, the pen can be used to select items on the screen or to generate an attention. Synonym for *light pen*.

serial. (1) Pertaining to a process in which all events occur one after the other; for example, serial transmission of the bits of a character according to V24 CCITT protocol. (2) Pertaining to the sequential or consecutive occurrence of two or more related activities in a single device or channel. (3) Pertaining to the sequential processing of the individual parts of a whole, such as the bits of a character or the characters of a word, using the same facilities for successive parts. (4) Contrast with *parallel*.

service access point. A logical point made available by an adapter where information can be received and transmitted. A single SAP can have many links terminating in it.

session. (1) In network architecture, an association of facilities necessary for establishing, maintaining, and releasing connections for communication between stations. (2) In MLT, synonymous with logical terminal (LT). (3) In SNA, a logical connection between two network addressable units that can be activated,

tailored to provide various protocols, and deactivated as requested.

Set Buffer Address (SBA) order. An order that sets the buffer address to a specified location.

simulation. (1) The representation of selected characteristics of the behavior of one physical or abstract system by another system. In a digital computer system, simulation is done by software; for example, (a) the representation of physical phenomena by means of operations performed by a computer system, and (b) the representation of operations of a computer system by those of another computer system. (2) Contrast with *emulation*.

SNA character string (SCS). A character string composed of EBCDIC controls, optionally intermixed with end-user data, that is carried within a request/response unit.

soft error. An intermittent error on a network that requires retransmission. Contrast with *hard error*.

Note: A soft error by itself does not affect overall reliability of the network, but reliability may be affected if the number of soft errors reaches the ring error limit.

solid-state component. A component whose operation depends on control of electric or magnetic phenomena in solids, for example, a transistor, crystal diode, or ferrite core.

staging adapter. (1) An addition to a System/370 Model 158 or 168 Integrated Storage Control (ISC) feature that enables the integrated storage control to operate in a 3850 Mass Storage System. (2) An IBM 3850 Model 3 Storage Control, which is a 3830 Model 2 Storage Control that has been modified to operate in a 3850 Mass Storage System.

star. A wiring arrangement in which an individual cable runs from each work area to a concentration point.

station. (1) An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line. (2) A location in a device at which an operation is performed, for example, a read station. (3) In SNA, a link station.

stop bit. Synonym for *stop signal*.

stop signal. In start-stop transmission, a signal at the end of a character that prepares the receiving device for reception of a subsequent character. Synonymous with *stop bit*.

storage. A unit into which recorded text can be entered, in which it can be retained and processed, and from which it can be retrieved. See also *memory*.

structured field. A data stream format that permits variable-length data and controls to be parsed into its components without having to scan every byte.

subsystem. A secondary or subordinate system, or programming support, usually capable of operating independently of or asynchronously with a controlling system. The 3174 and its attached terminals are an example of a subsystem.

switched line. A telecommunication line in which the connection is established by dialing. Contrast with *nonswitched* line.

synchronous. (1) Pertaining to two or more processes that depend on the occurrences of a specific event, such as common timing signal. (2) Occurring with a regular or predictable time relationship.

Synchronous Data Link Control (SDLC). A discipline conforming to subsets of the Advance Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. See also *binary synchronous communication (BSC)*.

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

system services control point (SSCP). In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its domain.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

T

telecommunication-attached. Pertaining to the attachment of devices by teleprocessing lines to a host processor. Synonym for *remote*. Contrast with *channel-attached*.

telecommunication control unit. See *communication control unit*.

terminal. In data communication, a display station or printer capable of sending or receiving information.

terminal adapter (TA). An adapter that provides control for a maximum of 32 terminals; each BNC connector (four in all) on the terminal adapter can control either one terminal that is directly attached or as many as eight terminals that are attached through a terminal multiplexer adapter (located in the 3174) or a 3299 Terminal Multiplexer (located outside the 3174).

terminal component. A separately addressable part of a terminal that performs an input or output function, such as the display component of a keyboard-display device or a printer component of a keyboard-printer device.

terminal emulation. The capability of a microcomputer, personal computer, 3270 CUT mode display station, 3270 printer, ASCII display station, or ASCII printer to operate as if it were a particular type of terminal linked to a processing unit and to access data.

terminal multiplexer. A device, such as the 3299 Terminal Multiplexer, for interleaving the signals for many devices onto a single coaxial cable.

terminal multiplexer adapter (TMA). This adapter is connected to the terminal adapter in the 3174 and provides control for a maximum of eight terminals.

terminal node. (1) In a hierarchical data base, a node that has no subordinate records or segments. (2) In SNA products, a peripheral node that is not user-programmable and has less processing capability than a cluster controller node. Examples are nodes consisting of the IBM 3277 Data Station, 3767 Communication Terminal, 3614 Consumer Transaction Facility, and 3624 Consumer Transaction Facility.

terminal port. (1) In a network, the functional unit of a node through which data can enter or leave the network. (2) The part of a processor that is dedicated to a single data channel for the purpose of receiving data from or transferring data to one or more external or remote devices.

terminal type menu. A list of all the available names and terminal types for a given port.

time-out. (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted. (3) A terminal feature that logs off a user if an entry is not made within a specified period of time.

to diskette. The diskette that receives the transferred data.

to drive. The drive that receives the transferred data.

token. In a local area network, the symbol of authority passed among data stations to indicate the station temporarily in control of the transmission medium.

Note: A token is a particular message or bit pattern that signifies permission to transmit.

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

transmission control unit (TCU). A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit, for example, the IBM 2702 and 2703 Transmission Controls. Contrast with *communication controller*. Synonymous with *telecommunication control unit*.

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

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

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

U

unprotected field. A displayed field in which a user can enter, modify, or delete data. Contrast with *protected field*.

update. In 3174 central site customizing, to tailor a library member's customizing data, in working copy, and put it back to the library diskette.

upgrade. In 3174 central site customizing, to select a library member and upgrade its data to the microcode level of the Central Site Customizing Procedure diskette.

upstream. (1) In the direction opposite to data flow or toward the source of transmission. (2) Toward the processor from an attached unit or end user. (3) Contrast with *downstream*.

Utility disk. A diskette or fixed disk that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

Utility (UTL) diskette. A diskette that contains the microcode necessary to run various utilities, for example, to copy portions of a diskette for a backup diskette.

V

V.35 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and conforms to the CCITT V.35 standard.

W

wire fault. An error condition caused by a break in the wires or a short between the wires (or shield) in a segment of cable.

work area. An area in which terminals (such as display stations, keyboards, and printers) are located. Access units may also be located in work areas.

wrap test. A test that checks attachment or control unit circuitry without checking the mechanism itself by returning the output of the mechanism as input. For example, when unrecoverable communication adapter or machine errors occur, a wrap test can transmit a specific character pattern to or through the modem in a loop and then compare the character pattern received with the pattern transmitted.

write. To make a permanent or transient recording of data in a storage device or on a data medium.

write control character (WCC). A character used in conjunction with a Write command to specify that a particular operation, or combination of operations, is to be performed at a display station or printer.

Write Structured Field (WSF) command. A command used to transmit data in structured field format.

X

X.21. In data communication, a recommendation of the International Telegraph and Telephone Consultative Committee (CCITT) that defines the interface between data terminal equipment and public data networks for digital leases and circuit switched synchronous services.

X.21 communication adapter. A communication adapter that can combine and send information on one line at speeds up to 64 kbps, and that conforms to CCITT X.21 standards.

X.25. In data communication, a recommendation of the CCITT that defines the interface between data terminal equipment and packet switching networks.

3

3270 data stream. (1) The commands, control codes, orders, attributes, and data or structured fields for 3270 devices, that are transmitted inbound to an application program or outbound to a terminal. (2) Data being transferred from or to an allocated primary or tertiary device, or to the host system, as a continuous stream of data and 3270 Information Display System control elements in character form.

3270 emulation. The use of a program that allows a device or system such as a personal computer or a System/38 to operate in conjunction with a host system as if it were a 3270-series display station or control unit.

Index

A

AC

- indicator 1-40
- line filter removal/replacement 3-18
- power supply 1-40
- power switch 1-26

Advance pushbutton 1-26

AEA

See asynchronous emulation adapter

alerts, operator-originated 2-178, 2-239

Alt 1 IML operations

- description 1-42
- normal IML 1-44
- procedures 1-42

Alt 1 normal IML description 1-44

Alt 1 pushbutton 1-27

Alt 2 procedures

Alt 2 IML description 1-45

Alt 2 pushbutton 1-27

Alternating Current (AC)

See AC

asynchronous emulation adapter

- communication links and associated hardware 1-35
- communications 1-32
- description 1-11
- device attachments 1-9
- direct cable 2-107
- direct cabling using a null modem 2-108
- external cables 2-106
- hardware 1-34
- I/O panel and cable removal/replacement 3-8
- modem cables 2-106
- modem specifications and switch settings 2-247
- optional tests 2-105
- physical and logical paths 1-36
- switched and nonswitched modem cable 2-106
- wrap plug 1-48
- wrap plug wiring 2-106, 2-109

Asynchronous Emulation Adapter online tests 2-170, 2-232

asynchronous emulation adapter (AEA) feature

- communications 1-32
- description 1-32

B

base hardware 1-5

C

call accepted (SVC) (X.25) B-5

call collision C-5

call connected (SVC) (X.25) B-5

call progress signal code (X.21) C-9

call progress (CP) signals C-5

call request (SVC) (X.25) B-5

central site change management 1-27

Central Site Customizing

change management, central site 1-27

Check Cond indicator 1-26

checking defective fuses 1-41

clear confirmation (SVC) (X.25) B-5

clear indication (SVC) (X.25) B-5

clear pushbutton 1-27

clear request (SVC) (X.25) B-5

codes, status

description 1-15

formats 1-16

operator panel display 1-16

color convergence 2-155, 2-217

COMM key (X.25) B-22

communication adapter

description 1-12

function number descriptions 2-99

optional tests 2-99

type 1 HG 11 1-11

compatibility, microcode support 3-2

configuration menu test 2 2-132, 2-193

configurations 1-5

3174 terminal adapter attachment 1-7

3174, general information 1-5

connection menu 1-37

control blocks, display 2-143, 2-205

control diskette 1-25

Control diskette event log 1-20

convergence, color 2-155, 2-217

copy files Utility 2-243

customize the Control disk 2-243

customizing

AEA feature 1-38

port type and port sets 1-39

stations and sets 1-38

D

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-6

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 1-26

data (PVC/SVC) (X.25) B-6
 data, vital 2-140, 2-202
 DC
 indicator 1-40
 power supply 1-40
 voltage test points 1-41
 device signal cable media connectors A-6
 description B-4
 timers B-4
 device status, 3270 2-134, 2-195
 diagnostic aids
 Asynchronous Emulation Adapter optional tests,
 running 2-105
 cause and diagnostic indicators (X.25) B-11
 communication adapter optional tests 2-99
 diskette drive media surface test (FN 02) 2-90
 diskette drive optional tests, running 2-90
 diskette drive ready test 2-90
 display fixed disk scan defect table (FN 34) 2-93
 display test monitor (terminal control) 2-118
 displaying the test log 2-116
 fixed disk drive defect fix test (FN 32) 2-92
 fixed disk drive full format test (FN 33) 2-93
 fixed disk drive optional tests, running 2-91
 fixed disk surface scan test (FN 31) 2-91
 hardware group basic tests description 2-81
 hardware group basic tests, running 2-89
 hardware group optional tests description 2-82
 hardware group test alls description 2-80
 hardware group test alls, running 2-88
 offline tests 2-80
 operator panel test 2-98
 reading the timer (FN 01) 2-97
 setting the timer (FN 02) 2-97
 terminal adapter/multiplexer optional tests,
 running 2-110
 test monitor 2-84
 test request format 2-82
 Token-Ring adapter tests, running 2-113
 X.25 cause and diagnostic codes B-24
 diagnostic aids configuration B 2-181
 diagnostic code(s)
 diagnostic code modifiers B-26
 from DCE B-27
 from DTE B-28
 diagnostic information 2-5
 Diagnostic Monitor
 displaying the test monitor (terminal control) 2-118
 how to load 2-84
 loading from diskette drive 1 2-84
 loading from diskette drive 2 2-85
 loading from fixed disk 2-85
 terminal control test menus 2-86
 diagnostic (PVC/SVC) (X.25) B-7
 Diagnostics
 dial mode screen description (X.25)
 CID (X.25) B-20
 CUG (X.25) B-21
 dial mode screen description (X.25) (*continued*)
 display screen B-19
 DPKT (X.25) B-21
 DWND (X.25) B-21
 HNAD (X.25) B-20
 IOPT (X.25) B-21
 I/O (X.25) B-21
 NPKT (X.25) B-20
 NWND (X.25) B-20
 OOPT (X.25) B-21
 QLLC (X.25) B-21
 RPOA (X.25) B-21
 TCLS (X.25) B-21
 dial strings 2-247
 direct cable 2-107
 direct cable using a null modem 2-108
 Direct Current (DC)
 See DC
 diskette drive(s)
 description 1-10
 diskette drive ready test 2-90
 drive 1 removal/replacement 3-13
 drive 2 removal/replacement 3-12
 media surface test (FN 02) 2-90
 running optional tests 2-90
 diskette(s)
 control diskette 1-25
 description 1-24
 DSL diskette 1-25
 limited function Utility diskette 1-25
 loading the test monitor from diskette drive 1 2-84
 loading the test monitor from drive 2 2-85
 RPQ diskette 1-25
 utility diskette 1-25
 3174 dump diskette 1-25
 display control blocks 2-143, 2-205
 display logs menu test 1 2-126, 2-187
 display scan defect table (FN 34) 2-93
 display test monitor (terminal control) 2-118
 display the Master Menu 2-242
 displaying the test log 2-116
 distributed function dump 2-180
 DSL diskette 1-25
 dump distributed function terminal 2-180
 dump procedure 2-260
 dump, test D distributed function terminal 2-241

E
 EIA/V.35 wrap plug 1-47
 Encrypt/Decrypt Utility 2-243
 Enter pushbutton 1-27
 environmental classifications 1-46
 environmental restrictions
 acoustics 1-46
 classifications 1-46
 gas 1-46
 humidity 1-46

- environmental restrictions (*continued*)
 - pollutants 1-46
 - shock 1-46
 - temperature 1-46
 - vibration 1-46
- event log
 - description 1-20
 - example 1-20
 - status code example 1-24
- Extension key (X.25)
 - Extension key and X.25 function keys (X.25) B-19
 - extension mode (X.25) B-17

F

- fan F1 removal/replacement 3-16
- fan F2 removal/replacement 3-17
- field replaceable unit (FRU)
 - AC line filter removal/replacement 3-18
 - asynchronous emulation adapter HG 21 1-11
 - Asynchronous Emulation Adapter I/O panel and cable removal/replacement 3-8
 - diskette drive 1 removal/replacement 3-13
 - diskette drive 2 removal/replacement 3-12
 - diskette drive(s) (01 or 02) 1-10
 - fan F1 removal/replacement 3-16
 - fan F2 removal/replacement 3-17
 - feature card removal 3-6
 - file adapter (HG 01, 02 and 03) 1-10
 - fixed disk drive (HG03) 1-10
 - fixed disk removal/replacement 3-14
 - identification 1-15
 - logic card replacement 3-6
 - operator panel removal/replacement 3-11
 - operator panel (HG 09) 1-10
 - planar board 1-10
 - planar board removal 3-19
 - planar board replacement 3-21
 - power supply removal/replacement 3-10
 - processor card HG 87 1-12
 - removal/replacement procedures 3-6
 - storage card (1MB) HG 87 1-12
 - storage card (2MB) HG 87 1-13
 - storage card (512KB) HG 87 1-12
 - terminal adapter (TA) HG 26 1-11
 - Token-Ring adapter card removal 3-9
 - Token-Ring Adapter HG 31 1-12
 - type 1 communication adapter (Models 51R and 61R only) HG 11 1-11
 - type 2 communication adapter HG 11 1-11
 - 3174 descriptions and functions 1-10
- file adapter (HG 01, 02, and 03) 1-10
- fixed disk CSU surface scan test (FN 51) 2-95
- fixed disk drive(s)
 - CSU surface scan test (FN 51) 2-95
 - defect fix test (FN 32) 2-92
 - description 1-10
 - display scan defect table (FN 34) 2-93

- fixed disk drive(s) (*continued*)
 - full format test (FN 33) 2-93
 - loading the test monitor from fixed disk 2-85
 - running optional tests 2-91
 - surface scan test (FN 31) 2-91
- fixed disk event log 1-20
- fixed disk removal/replacement 3-14
- FRU
 - See field replaceable unit (FRU)
- FRU type numbers 1-14
- function pushbuttons
 - Advance pushbutton 1-26
 - Alt 1 pushbutton 1-27
 - Alt 2 pushbutton 1-27
 - Clear pushbutton 1-27
 - description 1-26
 - Enter pushbutton 1-27
 - IML pushbutton 1-27
- function requests C-3
- functions, extended 2-155, 2-217

G

- general description
 - AC power switch 1-26
 - central site change management 1-27
 - control diskette 1-25
 - description 1-26
 - diskette drive(s) (01 or 02) 1-10
 - diskettes 1-24
 - DSL diskette 1-25
 - file adapter (HG 01, 02 and 03) 1-10
 - fixed disk drive (HG03) 1-10
 - function pushbuttons 1-26
 - hardware group numbers 1-13
 - keypad 1-26
 - limited function Utility diskette 1-25
 - operator panel 1-25
 - operator panel (HG 09) 1-10
 - RPQ diskette 1-25
 - status code assignments 1-18
 - status codes 1-15
 - utility diskette 1-25
 - 3174 dump diskette 1-25
- general information
 - diskettes 1-24
 - field replaceable unit identification (FRU ID) 1-15
 - introduction 1-3
 - Models 51R and 61R - telecommunications attached (remote) (EIA/V.35) 1-5
 - Models 52R and 62R - telecommunications attached (remote) (X.21) 1-5
 - Models 53R and 63R Token-Ring attached 1-5
 - terminal adapter attachment configurations 1-7
 - 3174 configurations 1-5
 - 3174 model 1R additional hardware features 1-6
- general procedures
 - analyzing a dump failure 2-261

general procedures (*continued*)
dump procedure 2-260
general procedures 2-242
patch procedure 2-250
path testing 2-262
terminal ready (S, 4, or 6) indicator check 2-247
3174 dump procedure 2-260
3174 patch procedure 2-250

H

hardware group
basic tests description 2-81
basic tests, running 2-89
number assignments 1-13
numbers 1-13
optional tests description 2-82
test alls description 2-80
test alls, running 2-88
Hayes Smart-Modem 1200
configuration switch settings 2-249
S Register settings 2-250
setup 2-249
specifications and switch settings 2-247
host communication configurations
how to display the master menu 2-242
how to run Asynchronous Emulation Adapter optional tests 2-105
how to set and read the timer 2-97
how to use the trace facility 2-167, 2-229
humidity 1-46

I

IBM Cabling System A-2
IBM Token-Ring Network operation 1-30
IBM 5821 and 5842
configuration switch settings 2-248
setup 2-248
specifications and switch settings 2-247
switch settings 2-248

Identify Customizing Keyboard

IML

Alt 1 IML operations 1-42
Alt 2 procedure 1-45
normal 1-42
pushbutton 1-27

IML pushbutton 1-27

incoming call (SVC) (X.25) B-5

indicators

AC power supply 1-40
DC power supply 1-40
description 1-26

indicators (X.25)

call ready B-15
communication reminder B-16
data ready (in use) B-16
dial in B-15

indicators (X.25) (*continued*)
disconnect in progress B-16
incoming call in progress B-15
local B-16
outgoing call in progress B-15
PVC indicators B-22
Initial Microcode Load (IML)
See IML
initial symptom chart 2-5

K

keypad 1-26

L

lamp test, how to perform 2-247
level, microcode support 3-2
limited function Utility diskette 1-25
LOCAL key (X.25) B-22
locations 3-2
logic card removal 3-6
logic card replacement 3-6
logical channels (X.25) B-4
logs, reset 2-139, 2-201
loop 2-84

M

maintenance analysis procedures
See MAPs (Maintenance Analysis Procedures)
MAPs (Maintenance Analysis Procedures)
MAP 0100 Check Condition Ind 2-7
MAP 0110 Operator Panel Isolation 2-9
MAP 0120 Status Code Not Indicated or Known 2-12
MAP 0200 Terminal Device(s) Problem Entry 2-13
MAP 0210 Terminal Adapter Isolation 2-14
MAP 0220 Terminal Attachment Configuration Chart 2-16
MAP 0230 3299 Model 2, 3 Isolation 2-17
MAP 0240 3299 Model 1 Isolation 2-23
MAP 0250 Terminal or Device Isolation 2-28
MAP 0300 Host Remote 3174 Isolation 2-30
MAP 0430 File Adapter or Drive Failures 2-34
MAP 0600 Token-Ring Network 3174 Isolation 2-36
MAP 0700 DC Indicator Is Off 2-39
MAP 0710 Power Load Isolation 2-41
MAP 1000 ASCII Problem Entry 2-43
MAP 1010 All ASCII Ports Are Failing 2-47
MAP 1020 Direct Connection Port—Any Failure 2-49
MAP 1030 Nonswitched Connection Port—Any Failure 2-56
MAP 1040 Switched Connect Port(s)—Any Failure 2-64
MAP 1050 3278 (or Equivalent) Terminal Failing to Communicate to ASCII 2-78

- master menu 2-242
 - master menu options 2-242
- Master Menu panel 2-242
- Media Management
- menu test online Config b 2-184
- menu, token-ring test 2-156, 2-218
- Merge DSL code 2-243
- Micom 3012 and 3024
 - configuration switch settings 2-250
 - specifications and switch settings 2-247
 - S1 and S2 switch group 2-250
- Microcode level support 3-2
- microcode support compatibility 3-2
- Microcode Upgrade 2-243
- modem
 - specifications and switch settings 2-247
 - switched and nonswitched cable 2-106
- modem specifications and switch settings 2-247
- Multi-Host Support 1-31
- multiple operational status codes 1-16

N

- normal operating procedure (X.25)
 - call ready (SVC only) B-9
 - cause and diagnostics indicators B-11
 - data ready B-10
 - description B-8
 - disconnection (SVC) B-10
 - exceptional case handling (X.25) B-11
 - incoming call (X.25) B-11
 - local mode (X.25) B-11
 - X.25 SVC states and key operation B-12

O

- offline test menu 2-123
- offline tests
 - communication adapter optional tests 2-99
 - description 2-80
 - diskette drive media surface test (FN 02) 2-90
 - diskette drive optional tests, running 2-90
 - diskette drive ready test 2-90
 - display fixed disk scan defect table (FN 34) 2-93
 - display FRU ID table (FN 05) 2-119
 - display hardware configuration (FN 04) 2-118
 - display test log (FN 01) 2-116
 - displaying the test log 2-116
 - fixed disk drive defect fix test (FN 32) 2-92
 - fixed disk drive full format test (FN 33) 2-93
 - fixed disk drive optional tests, running 2-91
 - fixed disk surface scan test (FN 31) 2-91
 - hardware group basic tests description 2-81
 - hardware group basic tests, running 2-89
 - hardware group optional tests description 2-82
 - hardware group test alls description 2-80
 - hardware group test alls, running 2-88
 - multiple-status-code presentation (operator panel) 1-17

- offline tests (*continued*)
 - operator panel test 2-98
 - reset test log - IML drive (FN 03) 2-118
 - single-status-code presentation (operator panel) 1-17
 - status-code presentation 1-17
 - status-code presentation (terminal) 1-17
 - terminal adapter/multiplexer optional tests, running 2-110
 - terminal control test menus 2-86
 - test parameters 2-84
 - test request format 2-82
 - Token-Ring adapter replacement 2-114
 - Token-Ring adapter tests, running 2-113
- online tests
 - applicable executive control programs 2-262
 - path testing 2-262
 - test menu 2-123
 - tests online, description 2-120
 - test 0 terminal check 2-125
 - test 1 display logs menu 2-126
 - test 2 configuration menu 2-132
 - test 3 3270 device status information 2-134
 - test 4 reset logs and cable errors 2-139
 - test 5 display vital data 2-140
 - test 6 display control blocks 2-143
 - test 7 color convergence 2-155
 - test 8 extended functions and programmed symbols 2-155
 - test 9 display the token-ring test menu 2-156
 - test 10 port wrap tests 2-166
 - test 11 trace control 2-167
 - test 12 Asynchronous Emulation Adapter tests 2-170
 - test A operator-originated alerts 2-178
 - test D distributed function terminal dump 2-180
- online tests config B
 - online test menu 2-184
 - tests online, description 2-181
 - test 0 terminal check Config B 2-186
 - test 1 display logs menu Config B 2-187
 - test 2 configuration menu Config B 2-193
 - test 3 3270 device status information Config B 2-195
 - test 4 reset logs and cable errors Config B 2-201
 - test 5 display vital data Config B 2-202
 - test 6 display control blocks Config B 2-205
 - test 7 color convergence Config B 2-217
 - test 8 extended functions and programmed symbols Config B 2-217
 - test 9 display the token-ring test menu Config B 2-218
 - test 10 port wrap tests Config B 2-228
 - test 11 trace control Config B 2-229
 - test 12 Asynchronous Emulation Adapter tests Config B 2-232
 - test A operator-originated alerts Congig B 2-239
 - test D distributed function terminal dump Config B 2-241

- operator panel
 - Advance pushbutton 1-26
 - Alt 1 pushbutton 1-27
 - Alt 2 pushbutton 1-27
 - Check Cond indicator 1-26
 - Clear pushbutton 1-27
 - Data Transfer Indicator 1-26
 - description 1-10, 1-25
 - Enter pushbutton 1-27
 - function pushbuttons 1-26
 - IML pushbutton 1-27
 - indicators 1-26
 - keypad 1-26
 - multiple operational status codes 1-16
 - operational-status-code presentation 1-16
 - removal/replacement 3-11
 - single operational status code 1-16
 - status code display 1-16
 - status code example 1-23
 - status indicators 1-26
 - testing 2-98
- operator panel lamp test 2-247

P

- packet types (X.25) B-4
- parts catalog 5-1
- patch procedure 2-250
- PC patches 2-250
- permanent virtual circuit (PVC) (X.25)
 - COMM key B-22
 - data B-6
 - LOCAL key B-22
 - PVC indicators B-22
 - PVC keys B-22
 - summary of states and indicators (X.25) B-23
- planar board
 - description 1-10
 - removal 3-19
 - replacement 3-21
- port type and port sets 1-39
- port wrap tests 2-166, 2-228
- power supply
 - AC line filter removal/replacement 3-18
 - AC power switch 1-26
 - DC voltage test points 1-41
 - description 1-40
 - problem determination 1-40
 - removal/replacement 3-10
 - voltage chart 1-41
- problem determination
 - See *also* MAPs (Maintenance Analysis Procedures)
 - IBM cabling system A-2
 - initial symptom chart 2-5
 - introduction 2-5
 - X.25 cause and diagnostic codes B-24
 - 3174 dump failure 2-261
 - 3299 terminal multiplexer reference A-3

- processor card HG 87 1-12
- PVC
 - See permanent virtual circuit (PVC) (X.25)

R

- reading the timer (FN 01) 2-97
- receiver not ready (PVC/SVC) (X.25) B-6
- receiver ready (PVC/SVC) (X.25) B-6
- release, microcode level support 3-2
- removal/replacement
 - AC line filter removal/replacement 3-18
 - Asynchronous Emulation Adapter I/O panel and cable 3-8
 - diskette drive 1 removal/replacement 3-13
 - diskette drive 2 removal/replacement 3-12
 - fan F1 removal/replacement 3-16
 - fan F2 removal/replacement 3-17
 - feature card removal 3-6
 - fixed disk removal/replacement 3-14
 - logic card replacement 3-6
 - operator panel 3-11
 - planar board removal 3-19
 - planar board replacement 3-21
 - power supply 3-10
 - procedures 3-6
 - storage card removal 3-7
 - Token-Ring adapter card removal 3-9
- reset
 - confirmation (PVC/SVC) (X.25) B-6
 - indication (PVC/SVC) (X.25) B-6
 - request (PVC) (X.25) B-5
- reset logs 2-139, 2-201
- restart confirmation (PVC/SVC) (X.25) B-6
- restart indication (PVC/SVC) B-6
- restart request (PVC/SVC) (X.25) B-6
- restrictions, environmental
 - acoustics 1-46
 - classifications 1-46
 - gas 1-46
 - humidity 1-46
 - pollutants 1-46
 - shock 1-46
 - temperature 1-46
 - vibration 1-46
- RPQ diskette 1-25
- running
 - communication adapter optional tests 2-99
 - diskette drive optional tests 2-90
 - fixed disk drive optional tests 2-91
 - operator panel test 2-98
 - Token-Ring adapter tests 2-113

S

- safety
 - general checklist guidelines 4-2
 - inspection guide 4-2

- safety (*continued*)
 - preparation 4-2
- scan defect table output 2-94
- service strategy 1-4
- setting the timer (FN=02) 2-97
- single operational status code 1-16
- special tools and tests
 - asynchronous emulation adapter wrap plug 1-48
 - description 1-47
 - EIA/V.35 wrap plug 1-47
 - Token-Ring adapter wrap plug 1-48
 - V.35 cable wrap plug 1-48
 - X.21 wrap plug 1-47
- stations and sets 1-38
- status and key operation (X.21) C-7
- status code assignments
 - description 1-18
 - example 1 operator panel 1-23
 - example 2 event log 1-24
 - 0000 through 0150 1-18
 - 1000 through 1099 1-19
 - 13xx 1-19
 - 2xx 1-18
 - 2xxx 1-19
 - 3xx 1-18
 - 3xxx 1-19
 - 4xx 1-19
 - 4xxx 1-20
 - 5xx 1-19
 - 5xxx 1-20
 - 6xx and 7xx 1-19
 - 7xxx 1-20
 - 8xx 1-19
 - 8888 1-20
- status codes
 - description 1-15
 - formats 1-16
 - operator panel display 1-16
- status indicators 1-26
- stop on error 2-84
- storage card removal Models 61R, 62R, and 63R 3-7
- storage card (1MB) HG 87 1-12
- storage card (2MB) HG 87 1-13
- storage card (512KB) HG 87 1-12
- summary of states and indicators (X.25) B-23
- support, multi-host 1-31
- SVC
 - See switched virtual circuit (SVC)
- switched virtual circuit (SVC)
 - call ready (X.25) B-9
 - data B-6
 - description B-7
 - disconnection (X.25) B-10
 - indicators B-7
 - key functions B-7
 - summary of states and indicators B-24
 - X.25 SVC states and key operation B-12

- symbols, programmed 2-155, 2-217

T

- temperature 1-46
- terminal adapter attachment configurations 1-7
- terminal adapter function numbers
 - multiplexer port wrap (FN 02) 2-111
 - multiplexer wrap all (FN 06) 2-112
 - printer exerciser test (FN 07) 2-112
 - terminal adapter port wrap (FN 01) 2-111
 - terminal adapter wrap all (FN 05) 2-112
 - terminal exerciser test (FN 04) 2-112
 - terminal path test (FN 03) 2-111
- terminal adapter (TA) HG 26 1-11
- terminal adapter/multiplexer optional tests, running 2-110
- terminal control 2-84
- terminal control test menus 2-86
- terminal ready (S, 4, or 6) indicator check 2-247
- test all 81 (CSU) 2-80
- test log
 - displaying the test log – IML drive (FN 02) 2-118
 - how to display the test log 2-116
- test menu, token-ring 2-156, 2-218
- test parameters
 - description 2-84
 - loop 2-84
 - stop on error 2-84
 - terminal control 2-84
- test request format 2-82
- test 0 terminal check 2-125
- tests online 2-120
- tests online, config B 2-181
- tests, online
 - test menu 2-123
 - tests online, description 2-120
 - test 0 terminal check 2-125
 - test 1 display logs menu 2-126
 - test 2 configuration menu 2-132
 - test 3 3270 device status information 2-134
 - test 4 reset logs and cable errors 2-139
 - test 5 display vital data 2-140
 - test 6 display control blocks 2-143
 - test 7 color convergence 2-155
 - test 8 extended functions and programmed symbols 2-155
 - test 9 display the token-ring test menu 2-156
 - test 10 port wrap tests 2-166
 - test 11 trace control 2-167
 - test 12 Asynchronous Emulation Adapter tests 2-170
 - test A operator-originated alerts 2-178
 - test D distributed function terminal dump 2-180
- tests, port wrap 2-166, 2-228
- test, alerts 2-178, 2-239
- test, dump 2-241

- test, lamp 2-247
- Token-Ring adapter
 - addressing 1-30
 - card removal 3-9
 - description 1-12
 - function numbers 2-114
 - wrap plug 1-48
- Token-Ring Gateway feature
 - description 1-29
 - microcode 1-30
- trace control 2-167, 2-229
- trace facility 2-167, 2-229
- type number assignments, FRU 1-14
- type numbers 1-14
- type 1 communication adapter HG 11 1-11
- type 2 communication adapter HG 11 1-11

U

- utility diskette 1-25

V

- virtual circuits (X.25) B-4
- vital data, display 2-140, 2-202
- V.35 cable wrap plug 1-48

W

- WARNING
 - Fixed Disk Full Format test 2-35
- wrap plug wiring 2-106, 2-109

X

- X.21 feature
 - error completion modifier bits C-10
 - functional description C-2
 - switched microcode function C-3
- X.21 wrap plug 1-47
- X.25 cause and diagnostic codes B-24
- X.25 feature
 - description B-1
 - display station requirement B-3
 - interface B-3
 - link level B-3
 - logical link control B-3
 - packet level B-3
 - physical level B-3
 - timers B-4
- X.25 network
 - call accepted (SVC) B-5
 - call connected (SVC) B-5
 - call request (SVC) B-5
 - clear confirmation (SVC) B-5
 - clear indication (SVC) B-5
 - data (PVC/SVC) B-6
 - incoming call (SVC) B-5
 - logical channels B-4

- X.25 network (*continued*)
 - packet types B-4
 - receiver not ready (PVC/SVC) B-6
 - receiver ready (PVC/SVC) B-6
 - reset confirmation (PVC/SVC) B-6
 - reset indication (PVC/SVC) B-6
 - reset request (PVC) B-5
 - restart confirmation (PVC/SVC) B-6
 - restart indication (PVC/SVC) B-6
 - restart request (PVC/SVC) B-6
 - virtual circuits B-4
- X.25 states B-8

Z

- zap patch 2-257
- zap patches 2-251

Numerics

- 3174 acoustics 1-46
- 3174 additional hardware features 1-6
- 3174 configurations
 - Models 51R, 52R, 61R, and 62R -
 - telecommunications attached (remote) (EIA/
 - V.35 1-5
 - Models 52R and 62R - telecommunications attached
 (remote) (X.21) 1-5
 - Models 53R and 63R Token-Ring-attached 1-5
- 3174 dump diskette 1-25
- 3174 dump procedure 2-260
- 3174 Establishment Controller
 - general information 1-3
 - IBM cabling system A-2
 - safety inspection guide 4-2
 - service strategy 1-4
 - 3299 terminal multiplexer reference A-3
- 3174 FRU
 - AC line filter removal/replacement 3-18
 - asynchronous emulation adapter HG 21 1-11
 - Asynchronous Emulation Adapter I/O panel and
 cable removal/replacement 3-8
 - descriptions and functions 1-10
 - diskette drive 1 removal/replacement 3-13
 - diskette drive 2 removal/replacement 3-12
 - diskette drive(s) (01 or 02) 1-10
 - fan F1 removal/replacement 3-16
 - fan F2 removal/replacement 3-17
 - feature card removal 3-6
 - file adapter (HG 01, 02 and 03) 1-10
 - fixed disk drive (HG03) 1-10
 - fixed disk removal/replacement 3-14
 - identification 1-15
 - logic card replacement 3-6
 - operator panel removal/replacement 3-11
 - operator panel (HG 09) 1-10
 - planar board 1-10
 - planar board removal 3-19

3174 FRU (*continued*)
planar board replacement 3-21
power supply removal/replacement 3-10
processor card HG 87 1-12
removal/replacement procedures 3-6
storage card removal 3-7
storage card (1MB) HG 87 1-12
storage card (2MB) HG 87 1-13
storage card (512KB) HG 87 1-12
terminal adapter (TA) HG 26 1-11
Token-Ring adapter card removal 3-9
Token-Ring Adapter HG 31 1-12
type 1 communication adapter (Models 51R, 53R,
61R, and 63R only) HG 11 1-11
type 2 communication adapter HG 11 1-11
3174 general description
hardware group numbers 1-13
locations 3-2
3174 hardware
safety inspection guide 4-2
3174 temperature and humidity limits 1-46
3174 terminal adapter attachment configurations 1-7
3270 device status 2-134, 2-195

**IBM 3174 Establishment Controller
Models 51R, 52R, 53R, 61R, 62R, and 63R
Maintenance Information**

**READER'S
COMMENT
FORM**

Publication No. SY27-2573-4

This manual is part of a library that serves as a reference source for systems analysts, programmers, and operators of IBM systems. You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

Note: Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system, to your IBM representative or to the IBM branch office serving your locality.

Possible topics for comment are:

Clarity Accuracy Completeness Organization Coding Retrieval Legibility

If you wish a reply, give your name, company, mailing address, date, and location of your local IBM branch office:

What is your occupation? _____

Number of latest Newsletter associated with this publication: _____

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments or you may mail directly to the address in the Edition Notice on the back of the title page.)

SY27-2573-4

Reader's Comment Form

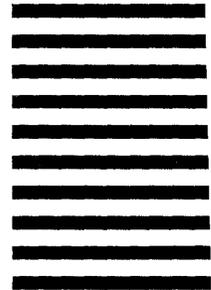
Fold and tape

Please Do Not Staple

Fold and tape



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 40 ARMONK, N.Y.

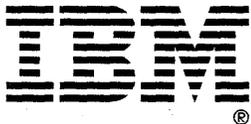
POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Dept. E02
P.O. Box 12195
Research Triangle Park, N.C. 27709-9990

Fold and tape

Please Do Not Staple

Fold and tape





Part Number
25F7653

File Number
36/38/370/4300/8100/3174-09

SY27-2573-04

