Passport 7400, 15000, 20000

Troubleshooting and Testing

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General availability. Contains information on Passport 7400, Passport 15000, and Passport 20000 for the PCR5.2 release.

Contents

List of figures

List of tables

About this document

This document describes Passport troubleshooting concepts and provides the procedures you need to troubleshoot the Passport system.

The following topics are discussed in this section:

Who should read this document and why

This guide is for anyone who performs the following tasks for configuring the Passport system:

- planning
- installing and provisioning
- operating and maintaining

What you need to know

This guide assumes that you understand the architecture and operation of Passport products. You also require basic UNIX knowledge.

You can acquire Passport product knowledge by reading 241-5701-030 *Passport 7400, 15000, 20000 Overview*.

Before you operate and maintain Passport, make sure you understand the following:

- Passport concepts
  - Passport hardware and software
  - Passport installation, commissioning, and provisioning
  - Passport-to-Passport interworking
  - Passport-to-DPN-100 interworking (applicable to Passport 7400 series only)
- UNIX
  - UNIX workstations
  - UNIX operating system, its facilities, and commands
- standard network operations and maintenance activities
- Preside Multiservice Data Manager workstation concepts

How this document is organized

See “Isolating the problem” (page 25) for troubleshooting information and the scope of this document.

What’s new in this document

The following features were added to this document:

- “Voice Services Processor 3 with Optical TDM Interface (2pOC3ChSmIrVsp3)” (page 21)
- “Y-protection with LAPS for 16pOC3PosAtm FPs” (page 21)

Other changes made to this document include the following:

- The purpose statement of the procedure “Determining the cause of degraded LAPS in FPs” (page 82) was clarified.

Voice Services Processor 3 with Optical TDM Interface (2pOC3ChSmIrVsp3)

The following sections were added or updated for this feature:

- "Passport 15000 or 20000 OC-3/STM-1 FP tests" (page 174)
- "Voice services processor 3 with optical TDM interface (VSP3-o) FP tests additional considerations" (page 177)
- "Data paths for VSP3-o FP port tests and loopbacks" (page 178)

Y-protection with LAPS for 16pOC3PosAtm FPs

The following were added or updated for this feature:

- the section "Troubleshooting function processors task flow" (page 67) to add Y-protection to the task flow
- the section "Determining the cause of degraded LAPS in FPs" (page 82) to put Y-protection in context and add a cross-reference to where the information is handled
- the section "Troubleshooting degraded LAPS with Y-protection" (page 85)
- the table "Troubleshooting FP problems" (page 70) to add the possibility of LAPS with Y-protection

Text conventions

This document uses the following text conventions:

- `nonproportional spaced plain type`

  Nonproportional spaced plain type represents system generated text or text that appears on your screen.

- **`nonproportional spaced bold type`**

  Nonproportional spaced bold type represents words that you should type or that you should select on the screen.

- *italics*

  Statements that appear in italics in a procedure explain the results of a particular step and appear immediately following the step.

  Words that appear in italics in text are for naming.

- `[optional_parameter]`

  Words in square brackets represent optional parameters. The command can be entered with or without the words in the square brackets.

- `<general_term>`

  Words in angle brackets represent variables which are to be replaced with specific values.

Related documents

See the following documents for related information:

- 241-5701-045 *Passport 7400, 15000, 20000 Management System User Interface Guide*. This document provides conceptual information about the Passport management system user interface.
- 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. This document provides conceptual and procedural information about configuring the Passport system.
- NN10600-605 *Passport - MDM Network Security: Operations*. This document provides information about setting up and maintaining security for the Passport system.
- 241-5701-611 *Passport 7400, 15000, 20000 Data Collection Guide*. This document provides conceptual and procedural information for working with the Passport data collection system.
- 241-5701-050 *Passport 7400, 15000, 20000 Commands*. This document describes the commands you use to operate and maintain Passport.
- For information on last minute updates, see the Release Notes for this PCR release. You receive this document with each software release.

How to get more help

For information on training, problem reporting, and technical support, see the “Nortel Networks support services” section in the *241-5701-030 Passport 7400, 15000, 20000 Overview*.

Chapter 1
Isolating the problem

Passport provides a variety of sources of information including OSI states, alarms, and state change notifications (SCN). Passport also provides a number of hardware diagnostic tests to help you identify hardware problems. "Troubleshooting components" (page 26) illustrates the components that provide troubleshooting information and diagnostic testing.

The most important piece of troubleshooting information is alarms. A Passport component generates an alarm when it detects a problem. The alarm contains useful information about the problem, including the OSI state and status of the component.

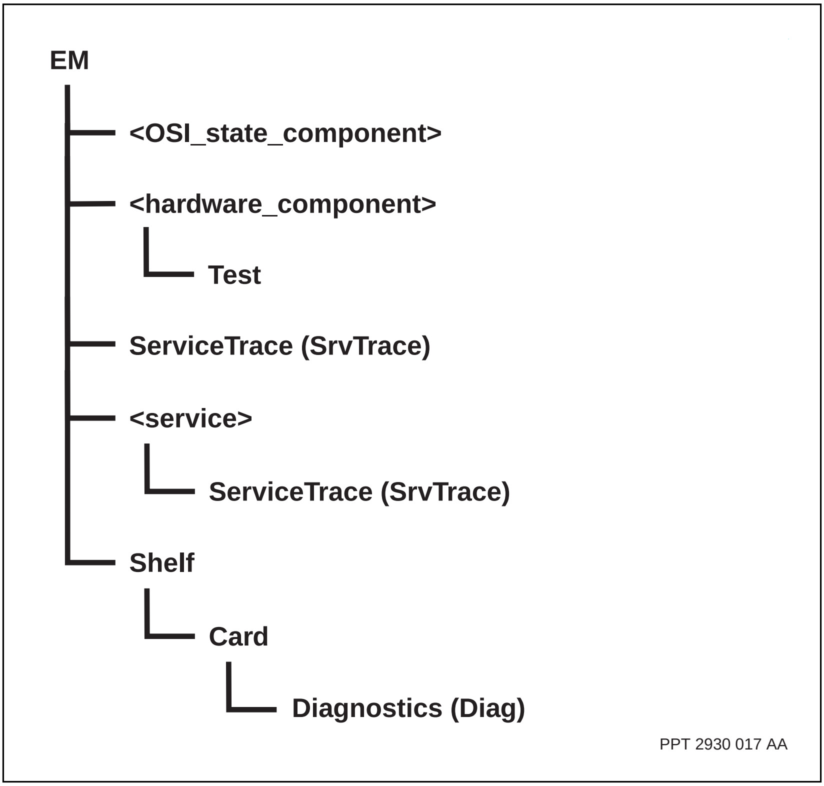
For complex service problems, you can use the Passport trace system to monitor data flow on a service. For complex card problems, you can retrieve debugging data that you can send to Nortel Networks technical support for analysis.

For details on troubleshooting information, see the following sections:

- "Alarms" (page 26)
- "OSI states and status" (page 28)
- "Passport trace system" (page 30)
- "Debug data" (page 31)
- "Diagnostic tests" (page 32)
- "Finding troubleshooting information" (page 33)

- “Collecting problem-related information required by Nortel Networks” (page 34)

Figure 1
Troubleshooting components



Alarms

An alarm appears on all operator sessions when a component of the Passport node detects a fault or failure condition with either itself or another component on the node. Alarms also appear when a component undergoes a significant state change. For example, an alarm appears when the operational state of an Lp changes from enabled to disabled.

A component generates an alarm in the following situations:

- quality of service degradation

- processing error
- hardware failure
- change of administrative OSI state
- security violation
- software error

There are three types of alarms: SET, CLR, and MSG. A component generates a SET alarm when it detects a problem and a CLR alarm when the problem clears. To clear some problems you need to do something (for example, replace a failed piece of hardware), or a problem can clear on its own (for example, congestion).

A component generates a MSG alarm when a significant event occurs about which you can do nothing. A MSG alarm can indicate a transient problem or an irreparable problem. A software error is an example of an irreparable problem.

To help you identify the cause of a problem, the component that detects the problem or is at the source of the problem generates an alarm. Other components impacted by the problem do not generate alarms. For example, a logical processor fails, which causes all its ports to fail. The LogicalProcessor component generates an alarm, but the port components do not generate alarms because the unavailability of the logical processor causes their failure. This alarm-generation strategy minimizes the number of alarms and helps you focus on the cause of the problem.

Alarms contain a great deal of information to help you troubleshoot the problem. Alarm information includes the OSI state and status values at the time the component generated the alarm as well as the severity, type, and probable cause of the alarm. An alarm can also include a comment that contains a brief information about the cause, impact, and recovery of the problem.

When you receive an alarm indication, see the “Symptoms” column in the troubleshooting tables:

- “Troubleshooting node outage problems” (page 42)

- “Troubleshooting control processor problems” (page 64)
- “Troubleshooting function processors” (page 67)
- “Troubleshooting file system problems” (page 282)
- “Troubleshooting problems with the data collection system” (page 293)

For detailed information on alarms, including information on specific alarms, see 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.

OSI states and status

The OSI state and status values indicate the condition of a component at a given time. This information is very useful when identifying problems and determining their cause. Whenever a component generates an alarm, the alarm includes a snapshot of its OSI state and status values.

The figure “OSI state and status attributes” (page 29) illustrates the attributes that represent the OSI state and status. Not all components support OSI attributes. Of the components that do support OSI attributes, not all support all attributes or all attribute values.

If a component supports OSI attributes, you can view their current values by displaying the OsiState group.

Figure 2
OSI state and status attributes

EM

<component>

adminState (osiAdmin)
operationalState (osiOper)
usageState (osiUsage)
availabilityStatus (osiAvail)
proceduralStatus (osiProc)
controlStatus (osiCntrl)
alarmStatus (osiAlarm)
standbyStatus (osiStby)
unknownStatus (osiUnknw)

PPT 2930 018 AA

There are three OSI states:

- administrative state

  The administrative state indicates whether or not an operator has locked the component. The possible values for administrative state are locked, unlocked, and shutting down. The shutting down state means that an operator has issued the lock command and the component is in the process of moving from the unlocked to the locked state.

- operational state

  The operational state indicates whether or not the component is operational. The possible values for operational state are enabled and disabled.

- usage state

  The usage state indicates whether or not the component is in use and whether or not it has spare capacity. The possible values for usage state are idle, active, and busy. An idle component is not in use. An active component is in use and has spare capacity. A busy component is in use but does not have spare capacity.

Whenever the OSI operational state of components modeled by Preside Multiservice Data Manager changes, Passport issues a state change notification (SCN). Preside Multiservice Data Manager uses this information to update its network model. By default, SCNs do not appear in operator sessions.

Combinations of state values indicate certain conditions. Knowing the details of a state combination can be very helpful when troubleshooting. You can find state combination tables that detail specific state combinations for many base system components in “OSI states” (page 295). You can find state combination tables for processor cards in 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*. Some service guides also include OSI state combination tables for the components of the service.

There are six OSI statuses that provide additional information about the condition of a component:

- alarm: details alarms generated by the component, which gives further information about the operational state
- procedural: details procedures performed by the component, which gives further information about the operational state
- availability: details the availability of the component, which gives further information about the operational state
- control: details the administrative state of the component
- standby: details the backup relationship of the component
- unknown: indicates if the real state of the component is unknown

For more information on OSI states and statuses, see 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.

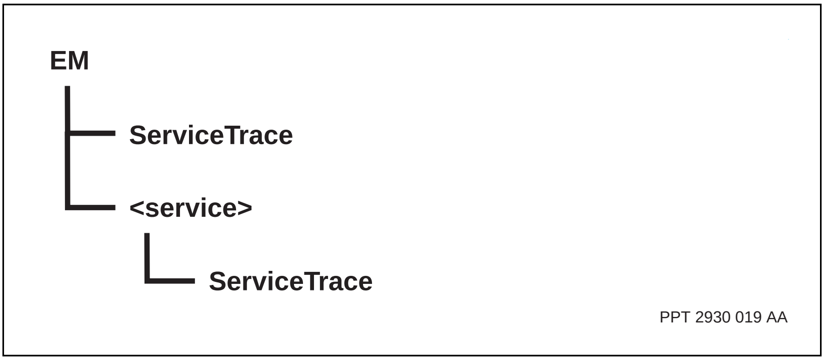
Passport trace system

You can monitor incoming and outgoing data of a particular service using the Passport Trace system. This detailed information can help you troubleshoot complex network problems.

Trace does not interrupt regular network activities. The figure “Trace system components” (page 31) illustrates the components of the Passport Trace system.

To trace the data of a service, you must add a top-level *ServiceTrace* component and a *ServiceTrace* subcomponent to the service you want to trace. For more information about Trace, see 241-5701-510 *Passport 7400, 15000, 20000 Trace Guide*.

Figure 3
Trace system components

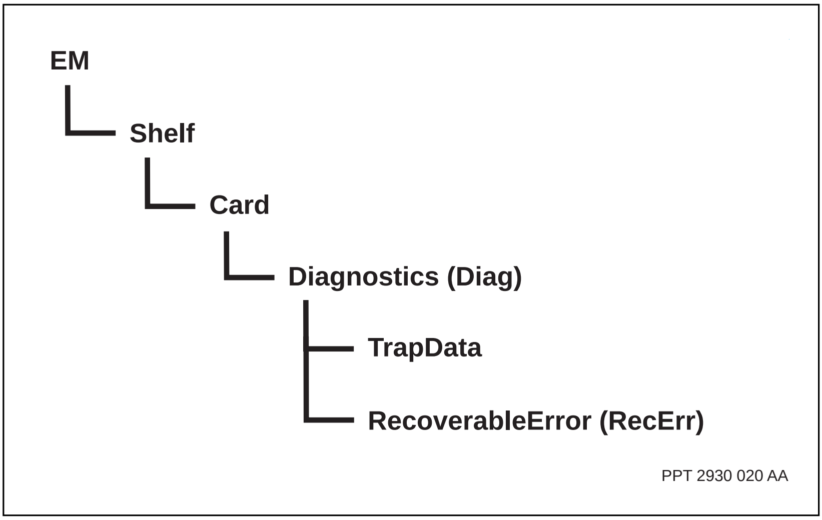


Debug data

For particularly complex problems, you can collect debug data to send to Nortel Networks technical support for analysis. The figure “Debug data components” (page 32) illustrates the components that represent the debug data available for processor cards.

When a processor card detects a critical fault or a recoverable error, it stores diagnostic information about the error. The processor card stores this information in memory even if it reloads. You can collect debug data about the last critical fault (a fault that causes a processor reload) from the *TrapData* component. You can collect debug data about the last recoverable error (a fault that does not cause a processor reload) from the *RecoverableError* component.

Figure 4
Debug data components



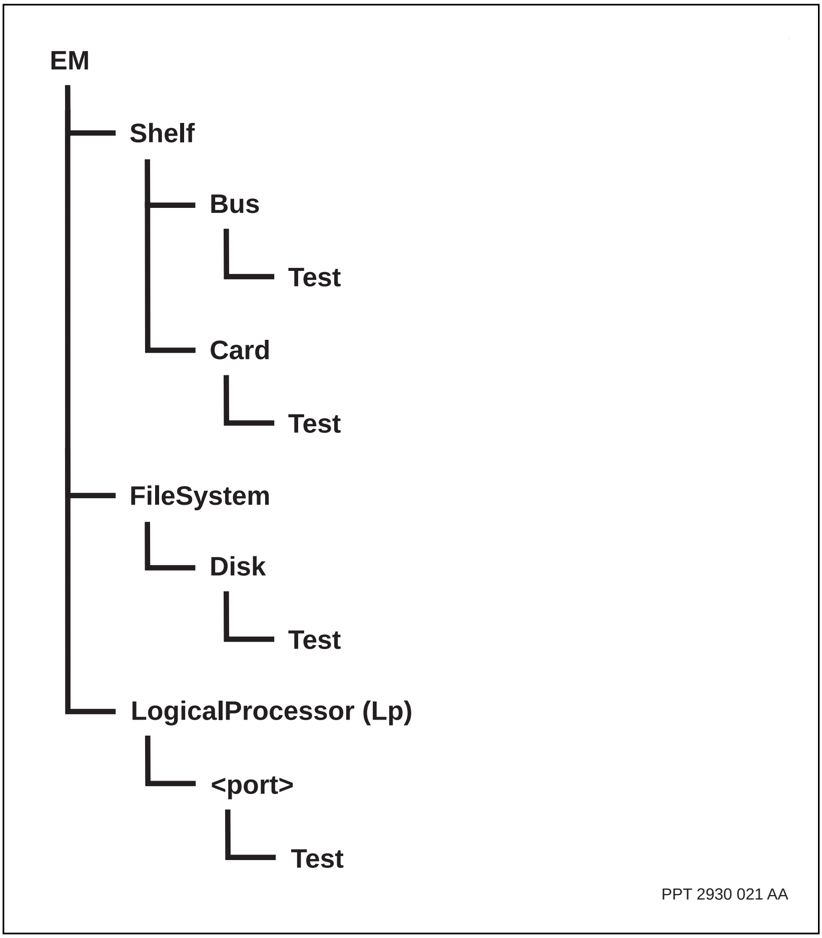
Diagnostic tests

Diagnostic tests allow you to test hardware that you have added to the Passport node and to test hardware that is not functioning properly within the node. The following tests are available:

- port tests: ensure the processor card ports can send and receive data
- line automatic protection switching port tests: when line APS is provisioned, the port tests described previously are run by the *Aps test* subcomponent on Passport 7400 series switches
- card tests: stress test the card
- bus or fabric tests: ensure that cards can communicate with other cards in the node
- disk tests: verify disk integrity or maintain the disk

A *Test* subcomponent controls each diagnostic test. The figure “Diagnostic test components” (page 33) illustrates the components for the available tests.

Figure 5
Diagnostic test components



Finding troubleshooting information

Use the table “Finding troubleshooting information” (page 34) to locate troubleshooting information in this document.

Table 1
Finding troubleshooting information

Problem area	Location of troubleshooting information
Node	“Troubleshooting the node” (page 41)
Control processor	“Card testing” (page 45)
	“Troubleshooting control processors” (page 57)
Function processor	“Card testing” (page 45)
	“Troubleshooting function processors” (page 67)
OAM Ethernet ports	“Testing the OAM Ethernet port” (page 97)
Function processor ports	“Function processor port test types” (page 103)
	“Testing ports and interfaces” (page 187)
	“Tests for function processors” (page 115)
Remote node	“Testing remote nodes for error detection for Passport 15000 and 20000 FPs” (page 225)
Sparing panel	“Verifying the operation of a sparing panel” (page 233)
Passport 15000 and 20000 fabric card	“Troubleshooting the Passport 15000 or 20000 fabric card” (page 239)
Passport 7400 bus	“Troubleshooting the Passport 7400 bus” (page 263)
File system	“Troubleshooting the file system” (page 279)
Data collection system	“Troubleshooting the data collection system” (page 293)

Collecting problem-related information required by Nortel Networks

If you encounter a problem that cannot be resolved with the information and procedures in this document then use the follow table to collect information required by Nortel Networks. After collecting the necessary information, contact Nortel Networks technical support for further assistance. See 241-5701-030 *Passport 7400, 15000, 20000 Overview* for Nortel Networks contact information.

Table 2
Collecting problem-related information required by Nortel Networks

Collect the following information:		Notes
	Alarms	Collect alarms that were raised in the hour preceding the crash for the affected Passport switch.
		On the Passport command line enter the following commands: telnet <Passport_IP> newfile col/ala sp In an FTP session, type the following commands: ftp <Passport_IP> cd /spooled/closed/alarm bin ls get <filename> bye
(Sheet 1 of 5)		

Table 2 (continued)
Collecting problem-related information required by Nortel Networks

Collect the following information:	Notes

State change notifications (SCNs)	Collect SCN entries that occurred in the hour preceding the crash for the affected Passport switch.
	
	On the Passport command line enter the following commands:
	
	`telnet <Passport_IP>`
	
	`newfile col/scn sp`
	
	In an FTP session, type the following commands:
	
	`ftp <Passport_IP>`
	
	`cd /spooled/closed/scn`
	
	`bin`
	
	`ls`
	
	`get <filename>`
	
	`bye`

(Sheet 2 of 5)	

Table 2 (continued)
Collecting problem-related information required by Nortel Networks

Collect the following information:		Notes

	Logs	Collect log information on the most recent provisioning or service changes made on the Passport switch.
		On the Passport command line enter the following commands:
		`telnet <Passport_IP>`
		`newfile col/log sp`
		In an FTP session, type the following commands:
		`ftp <Passport_IP>`
		`cd /spooled/closed/log`
		`bin`
		`ls`
		`get <filename>`
		`bye`

	Service degradation and service interruption records	Collect information on any degradations or service disruptions that you observed on the card either before or after the crash.
	Problem frequency records	If this is not the first time a crash has occurred, collect information about previous crashes, including frequency and the time of day at which they occurred.
	Description of network impact	Collect information on the number and type of services, circuits, and subscribers affected by the outage.
	List of cards with recoverable errors	
	Detailed information for all recoverable errors	
(Sheet 3 of 5)		

Table 2 (continued)
Collecting problem-related information required by Nortel Networks

Collect the following information:		Notes

	List of installed software
	
	List of installed patches
	
	List of active software
	
	List of active disruptive patches
	
	List of active non-disruptive patches
		Capture shelf-specific data, such as current software and patch level, the time since the last outage, the current committed file, a list of function processors that are currently inserted, and the control processor disk status.
		
		On the Passport command line enter the following commands:
		
		`display -current sw avl`
		
		`display -current -oper provisioning`
		
		`display -current -oper fs`
		
		`display -current sw patch`

	Operational data for each function processor	Capture card-specific data, such as CPU utilization, memory usage, and software features.
		
		On the Passport command line enter the following commands:
		
		`display -notab -prov lp/*`
		
		`display -notab -prov sw lpt/*`
		
		`display -notab -oper lp/*`
		
		`display -notab -oper shelf card/*`

(Sheet 4 of 5)		

Table 2 (continued)
Collecting problem-related information required by Nortel Networks

Collect the following information:		Notes
For crash data collection, collect the following:		
	Complete list of cards for which there is crash data	

	Detailed crash data for each card listed	Capture data logged on the Passport during the crash.
		
		On the Passport command line enter the following commands:
		
		`display -notab shelf card/* diagnostics recoverableerror line/*`
		
		`display -notab shelf card/* diagnostics trapdata line/*`
		
		`clear shelf card/n diagnostics trapdata`
		
		`clear shelf card/n diagnostics recoverableerror`

(Sheet 5 of 5)		

Chapter 2
Troubleshooting the node

Troubleshoot the node to determine the cause of the node outage. Power interrupts or a control processor failure (when a standby control processor is not available) are the most common causes of node outages. See the table “Troubleshooting node outage problems” (page 42) for detailed troubleshooting information. To determine why the node resets, see “Determining why the node resets itself” (page 43).

Table 3
Troubleshooting node outage problems

Symptom	Probable causes	Corrective measures
Entire Passport node is out of service (no components are functioning)	Loss of power to the cabinet	Restore power to the cabinet. For Passport 7400 the green LED on the door of the cabinet or rack mounted alarm panel should be lit to indicate that there is power to the shelf. For Passport 15000 and 20000 the rectangular, green power LED on the front of each breaker interface module should be lit. See Breaker interface modules in 241-1501-200 *Passport 15000, 20000 Hardware Description*
	All control processors have failed	See "Troubleshooting control processors" (page 57).
(Sheet 1 of 2)		

Table 3 (continued)
Troubleshooting node outage problems

Symptom	Probable causes	Corrective measures
	Improper installation of fabric cards	For Passport 15000 or 20000 the fabric LED should be solid green. See Status LEDs of a fabric in 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*
	Failure of MAC address module or Alarm/BITS module	DO NOT remove the MAC address or Alarm/BITS module. These modules are factory installed, tested and sealed. Eliminate all other possible causes for a node outage. If you suspect a problem with the MAC address module or Alarm/BITS module, contact Nortel Networks technical support. See Replacing a rear card or module in 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*
(Sheet 2 of 2)		

Determining why the node resets itself

When two control processors (CPs) are operating redundantly, the Passport node prevents automatic CP switchovers triggered by the *switchover lp/0* command from occurring more than once every 10 minutes. The Passport node considers that multiple CP switchovers within 10 minutes may be an indication of a serious fault. It attempts to recover from this potential fault, but the recovery has a more severe impact on service than the switchover.

When another CP switchover occurs within the timeout interval, and that switchover is not triggered by the *switchover lp/0* command, the subsequent switchover causes the shelf to reset. All traffic in progress is lost.

A CP switchover can occur automatically from detecting a fault in the active CP, or from any one of the following manual commands:

- *reset Shelf Card/<activeCP>*
- *reset Lp/0*
- *restart Shelf Card/<activeCP>*
- *restart Lp/0*
- *activate Prov* (during a software upgrade)
- *reload Cp Lp/0* (during a software upgrade)

A CP switchover can also be caused by unplugging the Ethernet cable from the faceplate of an active CP.

Any combination of automatic or manual CP switchovers within a 10-minute interval can trigger the shelf to reset. Determine why the Passport node reset itself by determining which switchovers occurred.

To prevent a shelf reset from too many switchovers:

- always use the *switchover* command because it is the method of causing a switchover that will not cause a shelf reset
- always wait 10 minutes real-time before entering a command that causes a switchover

Chapter 3
Card testing

Test a card to identify and remedy problems with Passport cards. This test verifies the operability of the card under test, the target card, and the fabric cards or buses.

- “Prerequisites to card testing” (page 45)
- “Card testing task flow” (page 45)

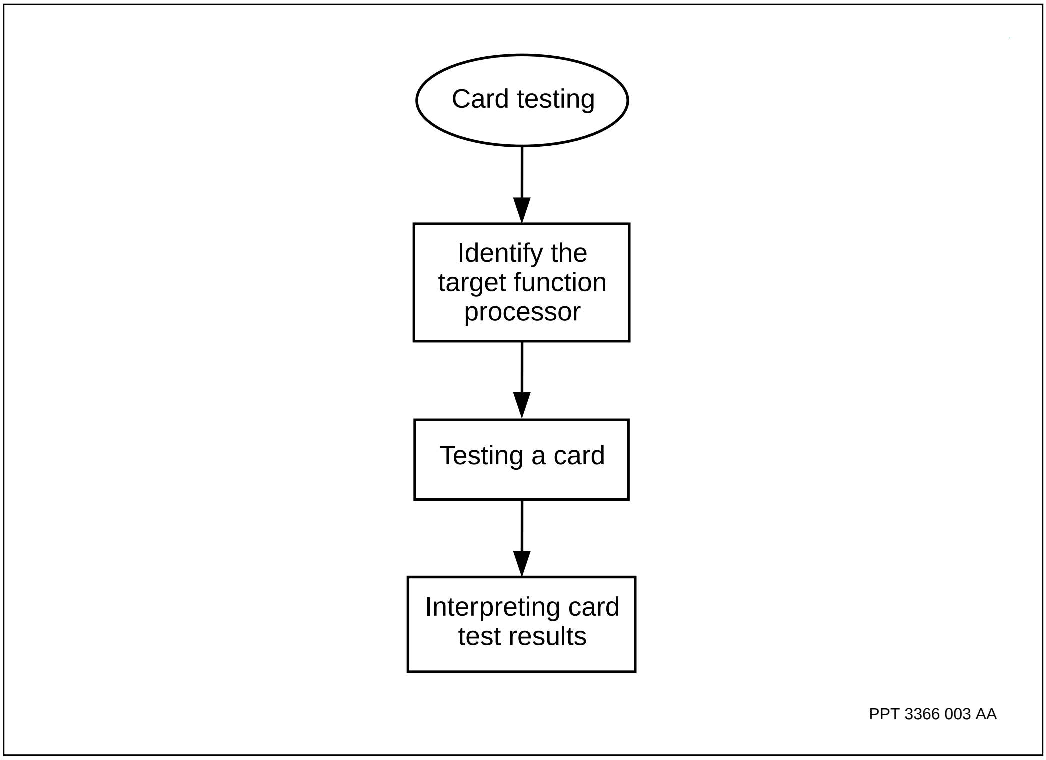
Prerequisites to card testing

- See “Supporting information for card testing” (page 55) for additional information.

Card testing task flow

This task flow shows you the sequence of procedures you perform to test a card. To link to any procedure, go to “Task flow navigation” (page 46).

Figure 6
Card testing task flow



Task flow navigation

- "Identifying the target function processor" (page 47)
- "Testing a card" (page 50)
- "Interpreting card test results" (page 52)
- "Supporting information for card testing" (page 55)

Identifying the target function processor

Identify the target FP to set which FP frames are transmitted to during the test.

Procedure steps

1 Set the target function processor card to which the frames transmit during the test:

```
set Shelf Card/<n> Test targetCard <targetNum>
```

Note: The processor card test does not operate when its own FP is the target card. If <target_num> is equal to <n> you cannot start the test. This is the default target selection.

2 Set the maximum amount of time that the test can run:

```
set Shelf Card/<n> Test duration <limit>
```

3 If you do not want the test to transmit both loading and verification frames, change the frame types:

```
set Shelf Card/<n> Test frmTypes <typeSet>
```

4 If you do not want to transmit low-priority frames only, change the frame priorities:

```
set Shelf Card/<n> Test frmPriorities <prioritySet>
```

CAUTION
Risk of data loss
Using large test frames in the next step can cause congestion and result in data loss.

5 If you want to change the size of frames that transmit during the test, set the size for the priority you selected in step 4:

```
set Shelf Card/<n> Test frmSize <priority> <size>
```

6 If you want to change the pattern for filling frames that transmit during the test, set the pattern type:

```
set Shelf Card/<n> Test frmPatternType <patternType>
```

7 If you want to change the default 32-bit customized pattern of alternating 0 and 1 bits, set the pattern:

```
set shelf Card/<n> test customizedPattern <pattern>
```

Variable definitions

Variable	Value
<limit>	specifies the maximum length of time (in minutes) that the processor card test can run. The default value is 60.
<n>	is the instance number of the test FP.
<pattern>	is a hexadecimal value from 00000000 to FFFFFFFF.
	The value of this attribute is ignored if *frmPatternType* does not have the value customizedPattern.
<patternType>	is one of the following:
	ccitt32kBitPattern (uses a pseudo-random sequence of 32 kbit, which is the default)
	ccitt8MBitPattern (uses a pseudo-random sequence of 8 Mbit)
	customizedPattern (uses the pattern defined by the *customizedPattern* attribute)
<priority>	is either lowPriority or highPriority.
<prioritySet>	alters the set of priorities and may include the following:
	<priority> adds the specified frame priority to the set.
	!<priority> clears the set and adds the specified frame priority to the set.
	‘<priority> removes the specified frame priority from the set.
<size>	is a value from 16 to 16000 bytes. The default for low-priority frames is 1024 bytes and for high priority-frames is 56 bytes. Larger test frames are useful for generating high bus or fabric card utilization rates. However, they can cause congestion, resulting in data loss.
<targetNum>	is the slot in which the target FP is inserted. This FP must have the same processing capability as the test FP.
(Sheet 1 of 2)	

Variable	Value
<type>	is either loading or verification.
<typeSet>	alters the set of frame types and may include the following: <type> adds the specified frame type to the set. !<type> clears the set and adds the specified frame type to the set. ~<type> removes the specified frame type from the set.
(Sheet 2 of 2)	

Procedure job aid

Figure 7
Identifying the target function processor component hierarchy

- **EM**
  - **Shelf**
    - **Card**
      - **Test**
        - Setup
          - targetCard (card)
          - frmTypes (types)
          - frmPriorities (priorities)
          - frmPatternType (fpt)
          - customizedPattern (cp)
          - duration
          - frmSize (size)
        - Results
          - elapsedTime
          - timeRemaining
          - causeOfTermination
          - loadingFrmData
          - verificationFrmData

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Testing a card

Test a card to stress a new or existing processor card under controlled conditions. The test sends frames over the Passport fabric card or bus between the card under test and a specific target card.

Prerequisites

- Before running the test using the procedure below, you must set the target FP using the procedure “Identifying the target function processor” (page 47).

Procedure steps

CAUTION
Risk of data loss
The activation of a card test consumes processor time and bus bandwidth on both the card being tested and the target card. Care must be taken when configuring card tests to ensure that the test frames generated during the tests do not cause data loss due to congestion.

1 Optionally, if you want to limit the testing to one fabric card or bus, lock the other fabric card or bus:

```
lock Shelf FabricCard/<f>
```

```
lock Shelf bus/<b>
```

The fabric card or bus that you use in the test must be unlocked and enabled, otherwise the lock command will fail. If you run the test with both fabric cards or buses in service, the processor card uses them equally.

2 Optionally, ensure that the card test is properly configured for the desired test:

```
display shelf card/<n> test setup
```

See “Identifying the target function processor” (page 47) for more information on changing the configuration. You cannot change the card test configuration once you start the test.

3 Start the card test:

```
start shelf card/<n> test
```

The test continues until it reaches the specified time limit. The test stops automatically if the target card becomes non-operational.

4 Optionally, you can end the test before it reaches the time limit:

```
stop shelf card/<n> test
```

5 You can view the results of a test while the test is in progress or after it is terminated:

```
display shelf card/<n> test results
```

You can display, individually, each attribute describing the results of a test.

6 Once the test is complete, release the other fabric card or bus if it was locked during the test:

```
unlock Shelf FabricCard/<f>
```

```
unlock shelf bus/<b>
```

Variable definitions

Variable	Value
<b>	is the instance value of the bus that is not in use in the test (either X or Y).
<f>	is the instance value of the fabric card that is not in use in the test (either X or Y).
<n>	is the instance number of the card being tested.

Interpreting card test results

Interpret card test results to view the results group of operational attributes of the *Test* component. You can display the full set of test results using the commands shown in the testing procedures. You can also display the individual test attributes.

For more information on the individual result attributes, see “Result attributes” (page 52).

To interpret the test results, refer to the following sections:

- “Interpreting loading frame stream test results” (page 53)
- “Interpreting verification frame stream test results” (page 54)

Result attributes

The following table, “Result attributes” (page 52), provides a definition of each test attribute.

Table 4
Result attributes

Attribute	Definition
causeOfTermination	This attribute offers one of the following explanations for a processor card test that has ended: neverStarted: the test has not been started testRunning: the test is currently running testTimeExpired: the test ran for the specified duration stoppedByOperator: a Stop command was issued targetFailed: the target FP became non-operational
elapsedTime	This attribute indicates the length of time, in minutes, that the processor card test has been running.
loadingFrmData	This attribute indicates the number of loading frames transmitted to the Test component on the target FP and the number of loading frames not successfully returned by the Test component on the target FP.
(Sheet 1 of 2)	

Table 4 (continued)
Result attributes

Attribute	Definition
timeRemaining	This attribute indicates the maximum length of time, in minutes, that the test is expected to continue to run before stopping.
verificationFrmData	This attribute indicates the number of verification frames returned by the Test component on the target FP and the number of verification frames that had incorrect bits when returned.
(Sheet 2 of 2)	

Interpreting loading frame stream test results

Use the table "Interpreting loading frame stream test results" (page 53) to interpret loading frame stream test results. For each result there is a number of suggested actions to correct any problems. Rerun the test after you complete each remedial action, or after you complete a set of remedial actions.

Table 5
Interpreting loading frame stream test results

Data value	Description	Remedial action
framesSent > 0 framesLost = 0	Loading frames are circulating properly between the FP under test and the target FP.	No remedial action is required.
framesSent > 0 framesLost > 0	Loading frames are lost as they circulate between the FP under test and the target FP. Frames can be lost due to congestion, mismatched FP types, or hardware problems.	You can reduce congestion by using smaller test frames or decreasing the amount of data passing through the FPs. Ensure that the FP you test and the FP you specify as the target card have the same processing capabilities. If the problem persists, try running bus or fabric card tests to isolate the defective hardware item.
framesSent = 0 framesLost = 0	The FP under test was unable to contact the target FP to begin the test.	No remedial action is required if the loading frame stream was not enabled during the test.

Interpreting verification frame stream test results

Use the table "Interpreting verification frame stream test results" (page 54) to interpret verification frame stream test results. For each result there is a number of suggested actions to correct the problems. Rerun the test after you complete each remedial action, or after you complete a set of remedial actions.

Table 6
Interpreting verification frame stream test results

Data value	Description	Remedial action
framesTested > 0 framesBad = 0	Verification frames are circulating properly between the FP under test and the target FP.	No remedial action is required.
framesTested > 0 framesBad > 0	Verification frames are being corrupted as they circulate between the FP under test and the target FP.	Rerun the processor card test using a different target FP. If the problem disappears, replace the original target FP. If the problem persists, replace the FP under test. Rerun the original test. If the problem persists after you replace both the test FP and the target FP, contact Nortel Networks.
framesTested = 0 framesBad = 0	One of the following situations is occurring: • The FP under test was unable to contact the target FP to begin the test. • The verification frames are lost due to congestion or hardware problems.	No remedial action is required if the verification frame stream was not enabled during the test.

Supporting information for card testing

The card test allows you to stress test new or existing processor cards under controlled conditions. The test sends frames over the Passport fabric card or bus between the card under test and a specific target card (*targetCard* attribute). The test verifies the card under test, the target card, and the fabric cards or buses. The test frames take the same route to the destination card as normal frames.

If the Passport 7400 node is in dual-bus mode, each test consumes bandwidth from both buses in equal amounts. If the module is in single-bus mode, the test runs only the bus in service.

If the Passport 15000 or 20000 node is in dual-fabric mode, each test consumes bandwidth from both fabric cards in equal amounts. If the node is in single-fabric mode, the test runs only the fabric card in service.

The processor card being tested generates test frames and groups them into the following streams:

- The loading frame stream rapidly circulates a set of loading frames between the function processor being tested and the target processor. This stream verifies the operation of the processor cards and the bus or fabric under a controlled load
- The verification stream transmits a series of verification frames from the function processor being tested to the target processor. As each frame returns, its contents are verified and the next verification frame in the series is transmitted. This stream verifies that frames are not corrupted during the transfer between function processors.

You can configure the processor card test to send loading frames or verification frames, or both (*frmTypes* attribute). You can also set the priority (*frmPriorities* attribute), size (*frmSize* attribute), and content (*frmPatternType* attribute and *customizedPattern* attribute) of the test frames.

Each function processor can run the processor card test independently. You can run the processor card test on any subset of the FPs simultaneously and specify different test frame configurations for each test. It is also possible for an FP to act as the target for more than one FP being tested, or while it is itself being tested.

You can configure a card to act as the target card for more than one card under test, and to act as a target card while it is itself under test.

For more information on processor cards, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide* and 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

Chapter 4
Troubleshooting control processors

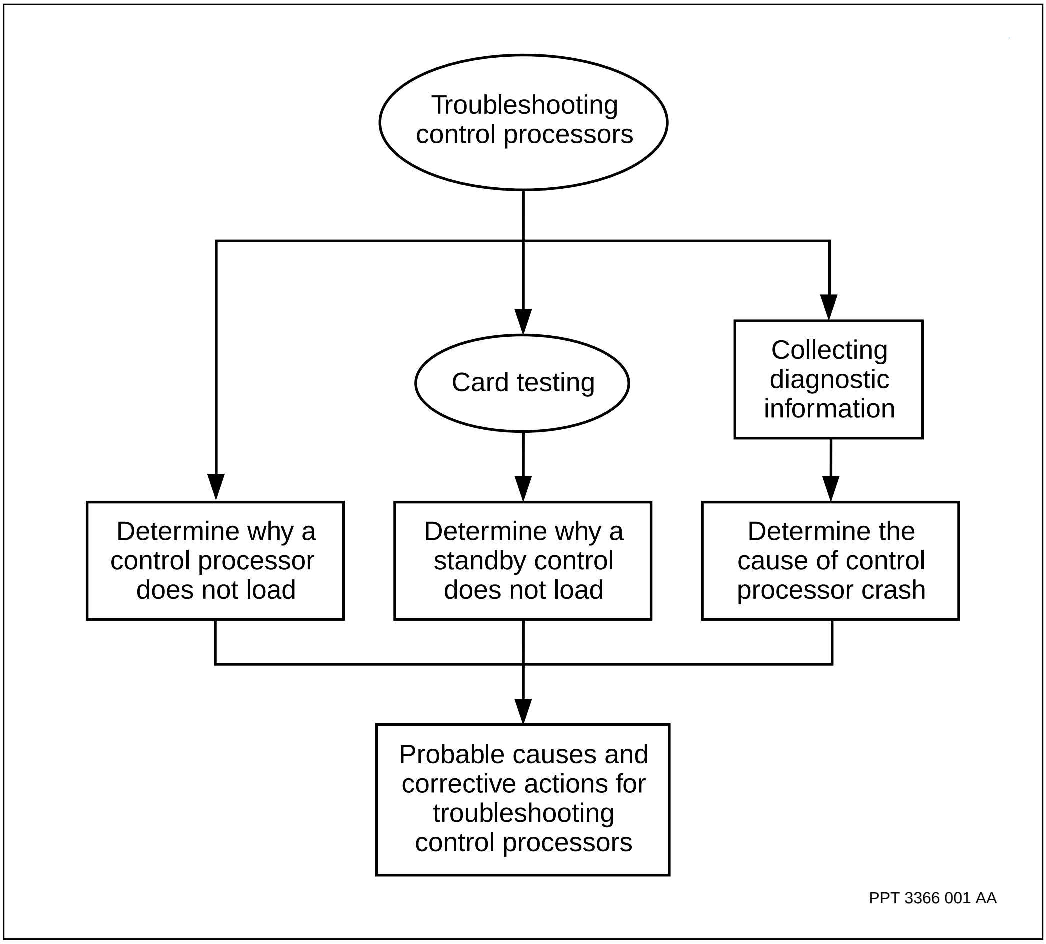
Troubleshoot control processors to determine the cause of a control processor problem. The most common problems with a control processor are software load failures and crashes. These problems can affect both the active and the standby control processor.

- “Troubleshooting control processors task flow” (page 57)

Troubleshooting control processors task flow

This task flow shows you the sequence of procedures you perform to test ports and port components. To link to any procedure, go to “Task flow navigation” (page 58).

Figure 8
Troubleshooting control processors task flow



Task flow navigation

- "Determining why a control processor does not load" (page 60)
- "Card testing" (page 45)
- "Determining why a standby control processor does not load" (page 61)
- "Collecting diagnostic information" (page 80)
- "Determining the cause of a control processor crash" (page 63)

- "Probable causes and corrective measures for troubleshooting control processor problems" (page 64)

Determining why a control processor does not load

Determine why a control processor does not load to resolve the problem that is causing a loading error.

Procedure steps

1 Verify that one of the control processors is attempting to load.

The control processor's LED flashes red whenever the control processor is loading. If the control processor is loading, wait a few minutes to determine if the attempt to load is likely to succeed. If the load attempt is successful, exit this procedure. If the load attempt fails, go to step 2.

2 Remove and reinsert the control processor.

If this action corrects the problem, exit this procedure and monitor the control processor for reoccurrences. If the problem persists, go to step 3.

3 Monitor the information output of the control processor on the local terminal as the control processor attempts to load.

If the information output indicates that a specific file cannot be loaded from the disk, then the disk is corrupt.

Replace the control processor and restore the disk from a backup copy using the procedure in 241-6001-023 *Preside MDM Configuration Management for Passport User Guide*.

Note: If you are using redundant control processors and the standby control processor now crossloads, reformat the standby control processor's disk. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

If the loading information indicates that bus errors are occurring, contact Nortel Networks (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*).

Determining why a standby control processor does not load

Determine why a standby control processor does not load to resolve the problem that is causing a loading error with the standby control processor.

Prerequisites

- Perform the task “Card testing” (page 45) before completing this procedure.

Procedure steps

1 Replace the standby control processor.

See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. If this action corrects the problem, exit this procedure and return the failed control processor for repair.

2 Determine the OSI states for the file system:

`display Fs OsiState`

If adminState is unlocked, operationalState is enabled, and usageState is active, the file system is functioning.

If any of the OSI state attributes for the file system have values other than those shown above, the file system is not available. Go to “Troubleshooting the file system” (page 279) to continue the troubleshooting analysis.

3 If you are using a Passport 15000 or 20000, determine the cardPortStatus of the fabric card ports:

`display Shelf FabricCard/<n> CardPort/*`

If CardPortStatus is OK for the standby control processor slot, you have verified that the fabric is functioning.

If CardPortStatus is none or is failed, replace the standby control processor. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

If the fabric card port still does not function, contact Nortel Networks.

4 If you are using a Passport 7400 series switch, determine the busTapStatus of the bus taps:

`display Shelf Bus/* busTapStatus`

If busTapStatus is OK for the standby control processor slot, you have verified that the bus is functioning.

If busTapStatus is none or busTapStatus is failed, replace the standby control processor. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

If the bus tap still does not function, contact Nortel Networks.

Variable definitions

Variable	Value
<n>	is the number of the fabric card.

Determining the cause of a control processor crash

Determine the cause of a control processor crash to resolve the problem that is causing the crash.

Prerequisites

- Perform the procedure “Collecting diagnostic information” (page 80) before completing this procedure.

Procedure steps

1 Replace the failed control processor.

See 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. If this corrects the problem, exit this procedure and return the failed control processor for repair.

2 Determine the memory utilization for the control processor:

```
display Shelf Card/<m> Utilization, Capacity
```

Compare the memory and message block usage against the capacity for the control processor. If the memory is near or at exhaustion, exit this procedure and reduce the number of features running on the Passport node. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

3 Open a customer service request for Nortel Networks if the previous steps fail to resolve the problem. “Collecting problem-related information required by Nortel Networks” (page 34).

Include the diagnostic information collected in step 2 for analysis.

Variable definitions

Variable	Value
<m>	is the slot number of the control processor.

Probable causes and corrective measures for troubleshooting control processor problems

Table 7
Troubleshooting control processor problems

Symptom	Probable causes	Corrective measures
Control processor does not load.	Processor failure	Replace the control processor. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
	Fabric card failure ***Note:*** This cause applies only to the Passport 15000 and 20000.	Contact Nortel Networks (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*).
	Unsupported PEC ***Note:*** This cause applies only to the Passport 7400 series switch.	Replace with a card supported by Passport 7400. See 241-7401-200 *Passport 7400 Hardware Description* for a list of cards supported by Passport 7400.
Control processor does not load and the Passport continually attempts to reboot. ***Note:*** This symptom applies to the Passport 7400 series switch only.	Incompatibility of the control processor's firmware with the Passport's newer shelf (AC shelf NTBP05BA or higher, or DC shelf NTBP64BA or higher). This problem can happen when you use an older control processor card that has been held in storage.	Check if the control processor has been in storage. If an older Passport shelf (AC shelf NTBP05AA or DC shelf NTBP64AA) is available, use that shelf to load the control processor with R1.2.3 or higher software. You can then install the control processor in the newer shelf. If an older Passport shelf is not available, contact Nortel Networks technical support for further instructions (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*). Do not return the control processor to Nortel Networks.
(Sheet 1 of 3)		

Table 7 (continued)
Troubleshooting control processor problems

Symptom	Probable causes	Corrective measures
Control processor crashes.	Hardware failure	Replace the control processor. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
	Software problem	Collect diagnostic information for the control processor and contact Nortel Networks technical support. See 241-5701-030 *Passport 7400, 15000, 20000 Overview* or 241-5701-030 *Passport 7400, 15000, 20000 Overview*.
	Memory exhaustion	Reduce the number of applications running on the Passport node.
Control processor switchover.	OAM Ethernet port failure	Troubleshoot the OAM Ethernet port. See “Testing the OAM Ethernet port” (page 97).
(Sheet 2 of 3)		

Table 7 (continued)
Troubleshooting control processor problems

Symptom	Probable causes	Corrective measures
Standby control processor does not load.	Processor failure	Replace the control processor. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
	File system failure	See “Troubleshooting the file system” (page 279).
	Fabric card failure ***Note:*** This cause applies to the Passport 15000 and 20000 only.	Contact Nortel Networks. See 241-5701-030 *Passport 7400, 15000, 20000 Overview*.
	Bus failure ***Note:*** This cause applies to the Passport 7400 series switch only.	Contact Nortel Networks. See 241-5701-030 *Passport 7400, 15000, 20000 Overview*.
Standby control processor does not load and the Passport continually attempts to reboot. ***Note:*** This symptom applies to the Passport 7400 series switch only.	Incompatibility of the control processor’s firmware with the Passport’s newer shelf (AC shelf NTBP05BA or higher, or DC shelf NTBP64BA or higher). This problem can happen when you use an older control processor card that has been held in storage.	Check if the control processor has been in storage. If an older Passport shelf (AC shelf NTBP05AA or DC shelf NTBP64AA) is available, use that shelf to load the control processor with R1.2.3 or higher software. You can then install the control processor in the newer shelf. If an older Passport shelf is not available, contact Nortel Networks technical support for further instructions (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*). Do not return the control processor to Nortel Networks.
(Sheet 3 of 3)		

Chapter 5
Troubleshooting function processors

Troubleshoot function processors (FPs) to correct hardware or software problems. FPs can experience problems with hardware and software integrity, bus or fabric card failure, and provisioning errors.

- "Prerequisites to troubleshooting function processors" (page 67)
- "Troubleshooting function processors task flow" (page 67)

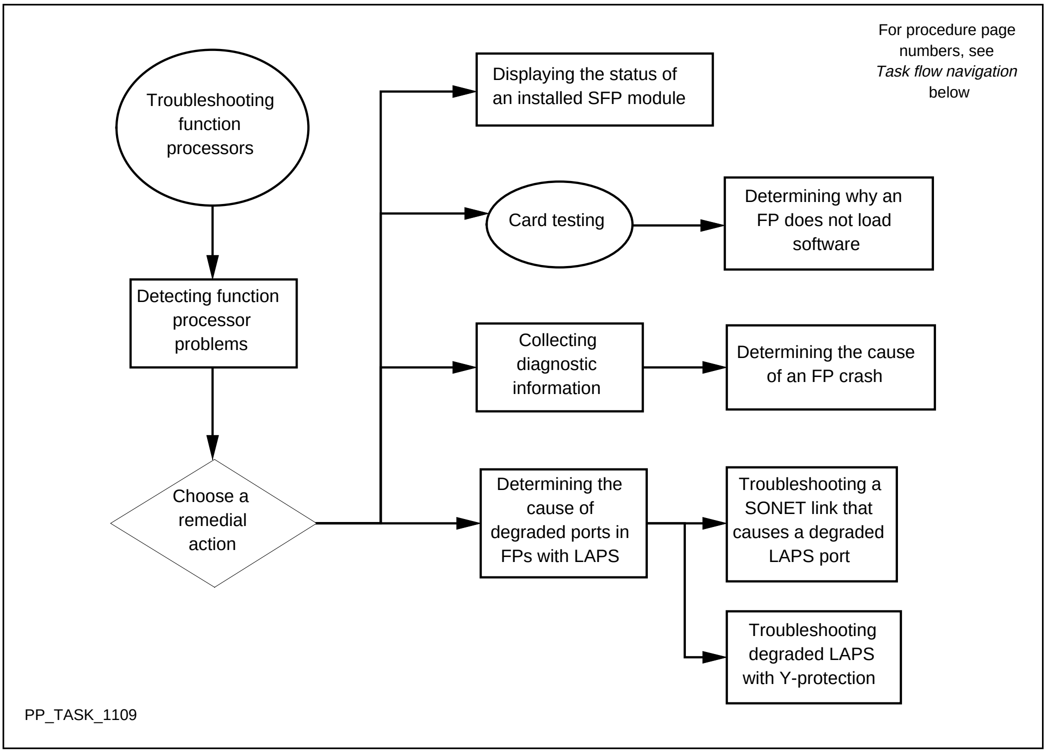
Prerequisites to troubleshooting function processors

- For information on handling symptoms that can occur when installing an OC-48 FP in a Passport 15000 or 20000, see the section on OC-48 in 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

Troubleshooting function processors task flow

This task flow shows you the sequence of procedures you perform to troubleshoot function processors (FPs). To link to any procedure, go to "Task flow navigation" (page 68).

Figure 9
Troubleshooting function processors task flow



Task flow navigation

The following procedures are listed in logical sequence (not alphabetical).

- “Detecting function processor problems” (page 70)
- “Displaying the status of an installed SFP module”. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
- “Card testing” (page 45)
- “Determining why an FP does not load software” (page 78)
- “Collecting diagnostic information” (page 80)
- “Determining the cause of an FP crash” (page 81)
- “Determining the cause of degraded LAPS in FPs” (page 82)

- “Troubleshooting degraded LAPS with Y-protection” (page 85)
- “Troubleshooting a SONET link that causes a degraded LAPS port” (page 92)

Detecting function processor problems

Detect function processor (FP) problems to discover what is preventing full operation and find a remedial action. The tables “Troubleshooting FP problems” (page 70) and “Methods for detecting FP problems” (page 74) indicate ways of detecting FP problems and suggest actions to take. One of the main indicators of a problem with an FP card is its status LEDs on the faceplate of the card. The table “LED indications of FP status” (page 76) identifies the meaning of the various LED colors of the processor card.

Table 8
Troubleshooting FP problems

Symptom	Probable causes	Corrective measures
FP crashes	Hardware failure	Replace the FP. See 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
	Software problem	Collect diagnostic information for the FP, “Collecting problem-related information required by Nortel Networks” (page 34), and then contact Nortel Networks technical support. See 241-5701-030 *Passport 7400, 15000, 20000 Overview*.
	Memory exhaustion	Reduce the number of applications running on the FP.
FP does not load	Processor failure	Replace the FP. See 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
	File system failure	See “Troubleshooting the file system” (page 279).
	Fabric card failure This applies only to the Passport 15000 or 20000.	See “Troubleshooting the Passport 15000 or 20000 fabric card” (page 239). Contact Nortel Networks (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*).
(Sheet 1 of 4)		

Table 8 (continued)
Troubleshooting FP problems

Symptom	Probable causes	Corrective measures
	Bus failure This applies only to the Passport 7400 series switches.	See “Troubleshooting the Passport 7400 bus” (page 263). Contact Nortel Networks (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*).
	Configuration error	Examine the configuration (provisioning) data and reconfigure as necessary.
	Unsupported PEC This applies only to the Passport 7400 series switches.	Replace with an FP that is supported by the type of switch: Passport 7400, Passport 15000, or Passport 20000. See 241-7401-200 *Passport 7400 Hardware Description*, or 241-1501-200 *Passport 15000, 20000 Hardware Description* for a list of cards supported by the switch type. Replace the card using the task in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
FP port is in service, but signals are not passing through it	SFP module failure	Determine the cause by displaying the operational status of the SFP module. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. If replacing the SFP module, see 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
(Sheet 2 of 4)		

Table 8 (continued)
Troubleshooting FP problems

Symptom	Probable causes	Corrective measures
FP with line automatic protection switching (LAPS) has degraded ports	Hardware failure, for example: • the physical cable through which the port communicates has been cut (not usually accompanied by an alarm) • a cable has been fractured or disengaged from its connector, or a connector at one end has been dislodged (effectively disconnected) between the sparing panel and the FP (usually accompanied by an alarm) • a unit of equipment that is involved between the near end and far end has failed, causing either a loss of service or power	Check the operational status of the far end port at the SONET level of software operations as described in "Troubleshooting a SONET link that causes a degraded LAPS port" (page 92). When two points of equipment involved in the connection path have the same out-of-service status, or the FPs at both ends show a green status but the SONET level shows the ports out of service, it is likely that a cable between them has been cut. Replace the cable. Check that all equipment between the near end and the far end of the FP connection is still installed properly, and in service. See the appropriate procedure to replace cables or equipment in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. For any other suspected cause, contact your next level of Nortel Networks technical support.
(Sheet 3 of 4)		

Table 8 (continued)
Troubleshooting FP problems

Symptom	Probable causes	Corrective measures
	Software failure, for example, the standby FP is not available to receive the traffic from the active FP because the standby port is not available: • the mate port is out of service • the mate FP is not in its slot or is unseated • the FP is out of service (for example, its sparing panel is unpowered or the card has failed and its status LED is solid red) • the FP has an error in configuration (provisioning) • manually force locking a protection line	Determine why the standby FP was removed or was unseated. Put a compatible FP back in the slot. See the appropriate FP procedure in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. Determine why the standby FP is out of service. Review the LAPS configuration (provisioning) data and reconfigure as necessary. Determine whether the application data is corrupt. Enter the command *clear laps/n*, where n identifies the line. For any other suspected cause, contact your next level of Nortel Networks technical support.
FP with Y-protection has degraded or out-of-service ports	A failure that involves how LAPS behaves. A failure or disconnection of one or more of the custom fiber optical Y-splitter cable assemblies.	Identify the cause of the LAPS degradation and fix it. Check the cable connectivity and throughput. Do the procedure "Troubleshooting degraded LAPS with Y-protection" (page 85).
(Sheet 4 of 4)		

Table 9
Methods for detecting FP problems

Observation	Action
The LED status display on the card is red (see “LED indications of FP status” (page 76)).	Replace the card with another card of the same type that you know is working. (For instructions, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.) Perform the task “Card testing” (page 45). If you resolve the problem by replacing the suspect card with a known operating card, contact your local Nortel Networks technical support group (see 241-5701-030 *Passport 7400, 15000, 20000 Overview*), and arrange to return the defective card. For instructions on packing the card, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
The LED status display on the card is red and the FP continually attempts to reboot. ***Note:*** This observation applies to the Passport 7400 series switch only.	The FP’s firmware is incompatible with your Passport’s newer shelf (ac shelf NTBP05BA or higher, or dc shelf NTBP64BA or higher). This problem can happen when you use an older FP. Check whether the FP has been in storage. If an older Passport shelf (ac shelf NTBP05AA or dc shelf NTBP64AA) is available, use that shelf to load the FP with R1.2.3 or higher software. You can then install the FP in the newer shelf. If an older Passport shelf is not available, contact your local Nortel Networks technical support group for further instructions. Do not return the FP to Nortel Networks.
The LED status display on the card is solid amber.	Ensure that you have provisioned the right type of FP. Ensure that FP has a valid PEC for the software load, the slot configuration, or its sparing mate (if present). See 241-7401-200 *Passport 7400 Hardware Description* or 241-1501-200 *Passport 15000, 20000 Hardware Description* for a list of supported cards.
(Sheet 1 of 3)	

Table 9 (continued)
Methods for detecting FP problems

Observation	Action
Both LEDs on the sparing panel are not lit while at least one control port cable is connected between the FP and the panel, and the FP shows any LED color.	The sparing panel has failed. Replace it according to 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade* or 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.
An alarm occurs to indicate there is a problem with the card or with the far-end card.	Alarms and remedial actions are described in 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.
You detect a problem while running diagnostic tests or while performing node troubleshooting.	Perform the task “Card testing” (page 45).
Frame loss or framing errors are occurring.	Set the *clockingSource* attributes of the ports as one of the following combinations: local at one end and line at the other, module at one end and line at the other, or module at both ends.
(Sheet 2 of 3)	

Table 9 (continued)
Methods for detecting FP problems

Observation	Action
A link problem is occurring, possibly caused by the card.	Ensure that the provisioning data is correct. Ensure that the required modem signals (readyLineState and dataTransferLineState) are provisioned to the ON state and that connecting device is supplying the expected incoming modem signals. Check cable connections. Ensure that the connectors on the FP have no bent pins. For instructions on how to check, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade* or 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. Ensure that you are using the correct termination panel for the card. (See 241-5701-030 *Passport 7400, 15000, 20000 Overview*.) For FPs that use an optical connection: • Check cable connections. Ensure that the optical connectors are clean. For instructions on cleaning FP transceivers, see 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. • Ensure that the pins on the optical bypass switch are not bent.
Termination panel lights do not come on.	Check cable pins for breakage.
(Sheet 3 of 3)	

Table 10
LED indications of FP status

LED indication	Card status
No color	No power is reaching the card.
Solid red	The FP is powered and is either performing self-tests or, after 30 seconds, is faulty. For Passport 15000 or 20000, the card may also be locked.
Slow pulsing red	The FP has passed self-tests but has not yet fully loaded its software.
(Sheet 1 of 2)	

Table 10 (continued)
LED indications of FP status

LED indication	Card status
Slow pulsing green	The FP's software is fully loaded but not yet activated. It may be initializing or in standby mode. For Passport 7400, the card may also be locked.
Fast pulsing green	The FP is running as standby.
Solid green	The FP is in active service. For a Passport 15000 or 20000 FP that is configured for dual-FP LAPS, both cards show a solid green LED when both cards have active ports on them.
Solid amber	The FP is not faulty, but cannot operate. (For example, the slot was provisioned for one card type but another type was inserted or for Passport 7400, the card is unsupported.)
(Sheet 2 of 2)	

Determining why an FP does not load software

Determine why a function processor (FP) does not load software to identify which one of the following possible causes is responsible:

- processor card failure
- file system failure
- bus failure (Passport 7400)
- fabric card failure (Passport 15000 or 20000)
- faulty configuration

Prerequisites

- Perform this procedure in operational mode
- Display the OSI state of the FP. If *adminState* is unlocked, *operationalState* is enabled, and *usageState* is active, the FP is operational.
- Perform the task “Card testing” (page 45) before this procedure.

Procedure steps

1 Remove and re-insert the failed FP.

If this action corrects the problem, exit this procedure and monitor the FP for re-occurrences. If the problem persists, go to step 2.

2 Replace the failed FP.

If this action corrects the problem, exit this procedure and return the failed FP for repair.

3 Determine the OSI states for the file system:

`display Fs OsiState`

If *adminState* is unlocked, *operationalState* is enabled, and *usageState* is active, the file system is functioning.

If any of the OSI state attributes for the file system have values other than those shown above, the file system is not available. Go to “Troubleshooting the file system” (page 279) to continue the troubleshooting analysis.

4 If you are working with a Passport 15000 or 20000, determine the *cardPortStatus* of the fabric card ports:

`display Shelf FabricCard/<n> CardPort/<m> cardPortStatus`

If *cardPortStatus* is OK for the FP slot, you have verified that the fabric card is functioning.

If *cardPortStatus* is none or failed, replace the FP.

Try using a different slot to provide service until you can replace the shelf.

If the fabric card still does not function, contact Nortel Networks.

5 If you are working with a Passport 7400 series switch, determine the *busTapStatus* of the bus taps:

`display Shelf Bus/* busTapStatus`

If *busTapStatus* is OK for the FP slot, you have verified that the bus is functioning.

If *busTapStatus* is none or failed, replace the FP.

Try using a different slot to provide service until you can replace the shelf.

If the bus tap still does not function, contact Nortel Networks.

Variable definitions

Variable	Value
<m>	is the slot number of the FP.
<n>	is the instance number of the fabric card.

Collecting diagnostic information

Collect diagnostic information to help identify the cause of a critical fault or recoverable error.

Prerequisites

- See the section “Supporting information for collecting diagnostic information” (page 95) for more information about this procedure.
- Perform this procedure in operational mode.

Procedure steps

1 Start a telnet session to the Passport node that is set to log screen output to a file.

2 Display the diagnostic information about the last critical fault on the processor:

`display Shelf Card/<m> Diag TrapData Line/*`

3 Display the diagnostic information about the last recoverable error on the processor:

`display Shelf Card/<m> Diag RecoverableError Line/*`

4 When you are certain the diagnostic information has successfully been logged to a file, clear it from memory:

`clear Shelf Card/<m> Diag TrapData`

`clear Shelf Card/<m> Diag RecoverableError`

Variable definitions

Variable	Value
<m>	is the slot number of the processor.

Determining the cause of an FP crash

Determine the cause of a function processor (FP) crash to identify why an FP crash has occurred.

Prerequisites

- Perform this procedure in operational mode.

Procedure steps

1 Replace the failed FP.

If this action corrects the problem, exit this procedure and return the failed FP for repair.

2 Determine the memory utilization for the processor card:

```
display Shelf Card/<m> Utilization, Capacity
```

Compare the memory and message block usage against the capacity for the card. If the memory is near or at exhaustion, exit this procedure and reduce the number of features running on the FP. See 241-5701-060 *Passport 7400, 15000, 20000 Components*.

3 Open a customer service request for Nortel Networks if the previous steps fail to resolve the problem. See “Collecting problem-related information required by Nortel Networks” (page 34) and 241-5701-030 *Passport 7400, 15000, 20000 Overview*.

Include the diagnostic information collected in “Collecting diagnostic information” (page 80) for analysis.

Variable definitions

Variable	Value
<m>	is the slot number of the FP.

Determining the cause of degraded LAPS in FPs

Determine the cause of degraded line automatic protection switching (LAPS) in an FP so that the protection (backup) of active ports can be restored and the loss of traffic can be prevented.

Prerequisites

- In a dual FP LAPS configuration (card-to-card or inter-card LAPS), a degraded port or card means the system may not switch traffic over to the mate. A degraded state usually indicates there is no backup for the port or card. If a system switchover is attempted while is LAPS degraded, the traffic may be lost. If a manual switchover is forced, traffic will be lost.
- You must determine the cause of the degradation so it can be fixed before removing a protected optical FP from service. Otherwise, replacing the FP can mean that services are not restored when the replacement FP is returned to service.
- Check for alarms generated against the equipment the FP connects to. At the time you are about to remove the unspared FP from service, use the alarm data to determine which equipment should be fixed first in order to minimize the extent of removing the unspared card from service. All alarms are described in 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.
- The causes are diverse and range from the SONET level of traffic down to the physical port on the FP or its cable. Exemplary causes of degraded LAPS ports or cards include:
  - LAPS is degraded when the mate port is out of service because service cannot be switched to the mate. If all ports on the active card are degraded, the mate card is unavailable for a switchover.
  - The card LED is solid green but at least one SONET link is lost at the logical processor (LP) level of the configuration due to a cut cable.
  - There is dirt on part of the endface of the fiber optical cable that is connected to an FP faceplate.
  - LAPS software may not have been configured (provisioned) correctly.

- Determining why a port is degraded depends on checking all associated software and hardware by a series of logical and sequential checks. The LAPS at both the near end and the far end of dual-FPs must be checked and compared in order to determine the cause of the degradation.
- Understand that when more than one port or line in the dual-FP configuration causes degraded LAPS, you must first address the card with the most problems. Since the cause of the degradation can be external to the FP, replacing the FP will not necessarily eliminate the degraded LAPS and it may cause the loss of traffic or services.
- When the dual-FP LAPS configuration also has Y-protection configured, the degradations for LAPS also apply to Y-protection. Additional degradations with Y-protection are described in the procedure “Troubleshooting degraded LAPS with Y-protection” (page 85).
- For more information on the commands that are used in the following procedure, see 241-5701-050 *Passport 7400, 15000, 20000 Commands*.
- Do the procedure commands in operational mode.

Procedure steps

1 Confirm that the mate FP that is to receive the traffic is compatible and is fully seated in its slot. If not, determine a compatible FP from 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*, and insert it according to 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.

2 Confirm that the LED of the mate FP is also solid green. If not, determine why the FP is not in service and decide when to address it. The switchover can occur only to an in-service FP (or port).

3 Confirm that the vintage of the mate card that is inserted in the slot is compatible with the card type and services that are configured in software for that slot. Follow the procedure for this in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. If not compatible, upgrade the switch software or replace the FP with a compatible one.

See the task to replace an FP in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*. See the task to upgrade the software in 241-5701-272 *Passport 7400, 15000, 20000 Software Upgrade*.

4 Check the switch for alarms 7012 0300 or 7012 0301 which indicate the presence and cause of degraded ports. Check the equipment identified by the alarm and fix whatever is causing the degradation.

Fix a configuration error by re-configuring the card or specific component. Since the card slot can be re-configured only when no card is seated against the backplane inside the FP slot, you must decide when to remove the card from service, namely, lose the active ports on it by removing it from service anyway. The procedures to remove an FP from service are in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

In the peculiar case of re-configuring an FP to fix a degraded port, you must remove the card from service to fix the port so that its mate card can transfer its traffic. This is a rare irony that can happen after commissioning the system or upgrading an FP that also has LAPS.

5 Check the switch for any alarm indicating a degraded signal. These alarms most often apply to equipment that is directly involved in the FP connection path, but do not necessarily originate from the FP. Determine the origin of the signal degradation and fix the equipment or software that is causing it.

Fix a SONET link by addressing the far-end cause of the degradation. For example, fix the failed or malfunctioning module of the transport node at the far end. If the far end is a Passport, decide which end should be fixed first (the highest priority traffic or the most traffic maintained for time spent). Address a SONET link that is degrading a port by following the procedure “Troubleshooting a SONET link that causes a degraded LAPS port” (page 92).

6 Verify whether your fix has enabled the degraded port.

`display laps/* osiState`

Under *osiAvail*, confirm the LAPS port you attempted to fix has an *osiOper* status of *ena* for enabled. If so, identify the next degraded port on the card and repeat step 4 to step 6. If not, contact your next level of Nortel Networks technical support.

7 When you cannot determine the cause of at least one degraded port in a dual FP pair, contact your next level of Nortel Networks technical support.

Troubleshooting degraded LAPS with Y-protection

Determine the cause of degraded LAPS in a dual- FP configuration that is also configured for Y-protection so that the system is ready for equipment protection (EP) and hitless software migration (HSM).

Prerequisites

- Only the 16-port OC-3/STM-1 POS and ATM FP (16pOC3PosAtm or NTHW44) supports Y-protection.
- You need a pair of small-form pluggable (SFP) fiber optical module transceivers with the PEC NTTP02CD for each pair of ports on the faceplates of the FPs. An NTHW44 has more than one version of SFP module, but only the single-mode (SM) intermediate reach (IR) NTTP02CD is supported for Y-protection.
- You need cable assemblies that comply with the specifications identified for Y-protection for 16-port OC-3/STM-1 POS and ATM FPs in 241-1501-200 *Passport 15000, 20000 Hardware Description*.
- The causes of degradation for a card or port in a dual-FP LAPS configuration (inter-card) also affect Y-protection. To ensure that a standard LAPS degradation is not causing a Y-protection degradation, do the procedure "Determining the cause of degraded LAPS in FPs" (page 82).
- Check for alarms generated against the equipment the FP connects to. The Y-protection alarms are 7011 5278, 7011 5279, and 7011 5280. All alarms are described in 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.
- Exemplary causes of degraded or failed Y-protection includes:
  - The standby mate card is not available to provide protection.
  - An active card was taken out of service manually or by the system fault detection.
  - The unspared far end connection has a problem or is unavailable.
- For more information on the commands that are used in the following procedure, see 241-5701-050 *Passport 7400, 15000, 20000 Commands*.

Procedure steps

1 Confirm that the LEDs of the paired FPs are both solid green (for the service active card and the hot standby card). If no LED is lit on the card, ensure that it is fully seated.

2 Confirm that both cards of the dual-FP configuration are fully seated.

3 Confirm that a pair of SFP modules is plugged into each port pair that has Y-protection configured in software, and that the fiber optical cable for each SFP is SM.

4 Confirm that the attribute *protocol* and associated attributes for the dual-FP software configuration are correct for Y-protection.

```
display -p laps/<p>
```

The response is very similar to the following.

```
customerIdentifier    = 0
workingLine           = lp/<p> sdh/<s>
protectionLine        = lp <q> sdh/<s>
mode                  = notApplicable
revertive             = notApplicable
mimicAps              = notApplicable
holdOffTime           = infinite seconds
waitToRestorePeriod = infinite minutes
signalDegradeRatio = notApplicable
protocol              = yProtection
primarySectionMismatchTime = infinite msec
```

Fix a configuration error by re-configuring the card or specific component. Fix a Y-protection error using the procedure to configure Y-protection in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. Since the card slot can be re-configured only when no card is seated against the backplane inside the FP slot, you must make the card the hot standby card and remove it from service. The procedures to remove an FP from service are in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

5 Use the table "Status of Y-protection during maintenance actions or faults" (page 87) to check the cables between the ports.

In the peculiar case of re-configuring an FP to fix a degraded port, you must remove the card from service to fix the port so that its mate card can transfer its traffic. This is a rare possibility that can happen after commissioning the system or upgrading an FP that also has LAPS.

6 When you cannot determine the cause of at least one degraded port in a dual FP pair, contact your next level of Nortel Networks technical support.

Variable definitions

Variable	Value
<p>	is the number of a degraded port.
<s>	Use an asterisk (*) to display all the ports on a card.

Procedure job aid

Table 11
Status of Y-protection during maintenance actions or faults

Maintenance action or fault	Impact on port operation	Alarm indications	Impact on port protection
locking the active FP with option *-force*	a hitless switchover occurs to all ports	• 0000 1000 for a locked LP • 7012 0200 for a disabled LP • 7012 0100 for a disabled card • 7011 5278 for degraded Y-protection	all newly active ports have become degraded because protection is unavailable
locking the standby FP	the standby card is unavailable as a backup	• 0000 1000 for a locked LP • 7012 0200 for a disabled LP • 7012 0100 for a disabled card • 7011 5278 for degraded Y-protection	all active ports have become degraded because protection is unavailable
(Sheet 1 of 5)			

Table 11 (continued)
Status of Y-protection during maintenance actions or faults

Maintenance action or fault	Impact on port operation	Alarm indications	Impact on port protection
locking an active port	traffic is dropped on that port	• 0000 1000 for a locked port • 7011 5279 for a Y-protection failure • 7011 5252 for a path remote failure indication at the far end • 7011 5203 for a line remote failure indication • 7011 5210 for a far-end line becoming unavailable	only the LAPS component of the locked port loses traffic
locking a standby port	the standby port is unavailable as a backup	• 0000 1000 for a locked port • 7011 5278 for a degraded Y-protection	LAPS becomes degraded because protection is unavailable
locking LAPS	traffic is dropped on the active port, but no switchover occurs	• 0000 1000 for locked LAPS • 7011 5203 for the far end ports raising a line remote failure indication • 7011 5210 for the far end ports being unavailable	only the LAPS component of the locked port loses traffic
(Sheet 2 of 5)			

Table 11 (continued)
Status of Y-protection during maintenance actions or faults

Maintenance action or fault	Impact on port operation	Alarm indications	Impact on port protection
the receive (Rx) line from the far-end of the FPs fails before the fiber optical split	traffic is dropped on that port	• 7011 5200 for detecting a loss of signal • 7011 5279 for a Y-protection failure • 7011 5501 for detecting a loss of cell delineation	traffic is dropped on the FP port pair because protection cannot extend to the far-end interface
the transmit (Tx) line from the dual FPs fails after the fiber optical split	the far end interface detects the traffic loss	• 7011 5252 for a path remote failure indication at the far end • 7011 5261 for the far-end path becoming unavailable • 7011 5280 for a Y-protection far-end receive failure • 7011 5203 for the far end ports raising a line remote failure indication • 7011 5210 for the far end ports being unavailable	no impact because transmission continues anyway
(Sheet 3 of 5)			

Table 11 (continued)
Status of Y-protection during maintenance actions or faults

Maintenance action or fault	Impact on port operation	Alarm indications	Impact on port protection
the active Tx line from the dual FPs fails before the fiber optical split	no switchover, but there is no traffic lost at the receive port	• 7011 5252 for a path remote failure indication at the far end • 7011 5261 for the far-end path becoming unavailable • 7011 5280 for a Y-protection far-end receive failure • 7011 5203 for the far end ports raising a line remote failure indication • 7011 5210 for the far end ports being unavailable	no impact because transmission continues anyway
the active Rx line to the dual FPs fails after the fiber optical split	traffic is dropped on that port	• 7011 5200 for a loss of signal (LOS) • 7011 5279 for a Y-protection failure • 7011 5251 for the far end raising an alarm indication signal (AIS) • 7011 5501 for detecting a loss of cell delineation	only the LAPS component of the locked port loses traffic
(Sheet 4 of 5)			

Table 11 (continued)
Status of Y-protection during maintenance actions or faults

Maintenance action or fault	Impact on port operation	Alarm indications	Impact on port protection
the standby Tx line from the dual FPs fails	no impact	nothing is detected or reported	no impact
the standby Rx line to the dual FPs fails	no impact	• 7011 5200 for a loss of signal (LOS) • 7011 5278 for a degraded Y-protection	LAPS becomes degraded because protection is unavailable
(Sheet 5 of 5)			

Troubleshooting a SONET link that causes a degraded LAPS port

Troubleshoot a SONET link that causes a degraded LAPS port to:

- identify the SONET link that passes through the degraded port
- query the status of the SONET link
- fix the problem with the SONET link

Prerequisites

- For more information on the commands that are used in the following procedure, see 241-5701-050 *Passport 7400, 15000, 20000 Commands*.
- Do the procedure commands in operational mode.

Procedure steps

1 Confirm if LAPS is degraded.

```
display laps/<p> avail
```

The *availabilityStatus* is confirmed as *degraded* (or *degrade*).

2 Identify the active SONET link of the working and protection pair.

```
display laps/<p> nearEndRx
```

The *nearEndRxActiveLine* is the *working* line or the *protection* line, whichever one is identified is the active line. Whichever line includes the status *signalFailure*, that line is not operating.

3 Identify the SONET link of the working line.

```
display -p laps/<p> working
```

For example, for the working line of logical processor (LP) 12 and SONET link 2, the response would indicate:

workingLine = Lp/12 Sonet/2

4 Identify the SONET link of the protection line.

```
display -p laps/<p> protection
```

5 Query the status of the LP with the non-active line, since it is the one causing the degradation.

```
display lp/<lp> sonet/*
```

When the status of *osiOper* is other than *enabled*, the problem is at the far end of the FP. Contact the support personnel of that equipment and ask them to fix the problem. The status *txAis* indicates an error internal to the FP or the Passport switch. Examples of common far-end problems include:

- *LOS* for a cut or broken fiber optic cable (accompanied by a section alarm) or a cable that is pulled from a connector without necessarily being visibly disengaged
- *LOF* for a failed card or module on a far-end node (accompanied by a section alarm)
- *AIS* for a fault in the next hop towards the far end or beyond the far end and into the network
- *RFI* for a fault between the Passport transmit (Tx) line and the far-end terminating equipment receive (Rx) line

6 Query the status of the LP with the active line.

```
display lp/<lp> sonet/*
```

When the status of *osiOper* is other than *enabled*, the problem is at the far end of the FP. Contact the support personnel of that equipment and ask them to fix the problem. The status *txAis* indicates an error internal to the FP or the Passport switch. Examples of common far-end problems are listed in step 5.

7 When you cannot fix the SONET line problem, or the SONET line is not incrementing for either:

- Sect Code Violations
- Line Code Violations

contact your next level of technical support to determine your course of action.

Variable definitions

Variable	Value
<lp>	is number of the logical processor (LP) of either the working line or the protection line that has been identified in the procedure.
<p>	is the number of a degraded port that was identified in the procedure for removing from service an FP configured with LAPS in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Supporting information for collecting diagnostic information

When a processor card detects a critical fault or a recoverable error, it stores diagnostic information about the error, even if the processor reloads. Nortel Networks support personnel can analyze this diagnostic information and use it for troubleshooting.

You can collect diagnostic information about the last critical fault and the last recoverable error on a processor card by displaying operational subcomponents of the *Card* component. These components contain line-by-line detail of the last critical fault (trap data) and last recoverable error. Once you have displayed the diagnostic information and stored it for analysis, you can clear the information from the processor.

You can also collect diagnostic information for analysis by turning on the spooling of debug data to a file and then recreating the error. After you have recreated the error, the diagnostic information is contained in the debug data file.

If a FP that does not load has been in storage, see the table “Troubleshooting FP problems” (page 70) before collecting diagnostic information.

Chapter 6
Testing the OAM Ethernet port

Test the OAM Ethernet port to verify the operation of the port device or link.

Prerequisites

- Perform this procedure in operational mode.
- See “Supporting information for testing the OAM Ethernet port” (page 100) for addition information about this procedure.
- The Lp/0 oamEnet/0 LanTest component is visible but unavailable in the data model for a CP3 on the Passport 15000 and 20000.

Procedure steps

CAUTION
Potential loss of Preside Multiservice Data Manager connectivity
Locking the OAM Ethernet port disconnects all connections to the Passport that use this port. Ensure that the connection through which you are issuing the lock command does not use the OAM Ethernet port.

1 Lock the OAM Ethernet port:

```
lock -force -forever Lp/0 oamEnet/0
```

Note 1: Use the -force option to place the port in an immediate locked state, without going through the shutting down state.

Note 2: Use the -forever option to lock the port permanently until you issue an unlock command. Without this option, the port locks for a maximum of 5 minutes before being unlocked automatically.

2 Assign the type of test to be conducted:

```
set Lp/0 oamEnet/0 Test type <type>
```

Note: These four tests are mutually exclusive. They cannot execute concurrently.

3 Initiate the test:

```
start Lp/0 oamEnet/0 Test
```

Note: It is not necessary to use the stop command as the test takes a very small amount of time to execute. If an error occurs and the test does not terminate properly, the hardware detects this and terminates the test.

4 Review the results of the test:

```
display Lp/0 oamEnet/0 Test
```

The tests return pass/fail information. If an Ethernet port fails any test, switch to the standby CP and contact your Nortel Networks representative.

5 If the Ethernet port passes all tests, unlock the port:

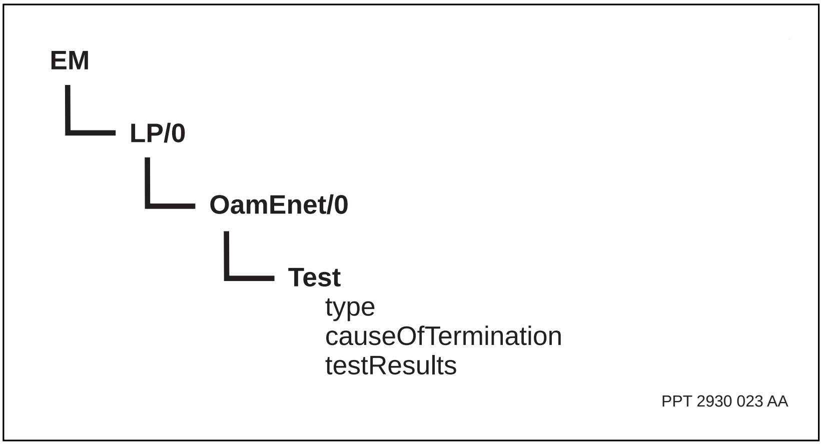
```
unlock Lp/0 oamEnet/0
```

Variable definitions

Variable	Value
<type>	is one of hardwareLogic, configuration, memoryMap, or tdr.

Procedure job aid

Figure 10
Testing the OAM Ethernet port component hierarchy



Supporting information for testing the OAM Ethernet port

The OAM Ethernet port has a dynamic *Test* component which is created upon configuration of the *oamEnet* component.

Only users with SYSADMIN impact can perform these tests.

There are four tests that you can execute on the Ethernet port. The first three verify the port device; the fourth one verifies the link.

- The hardware test verifies the Ethernet controller hardware logic.
- The configuration test verifies the configuration of the device driver.
- The memory map test verifies the memory map of the receive and transmit buffers lists.
- The time domain reflectometry (TDR) test detects the presence of open or short circuits and their distance from the port.

The tests return pass/fail information. If an Ethernet port fails any test, switch to the standby CP and contact your Nortel Networks representative.

> ***Note:*** The OAM Ethernet port tests are not supported on CP3 on the Passport 15000 or 20000.

There are two conditions related to the OAM Ethernet port component that can cause a CP switchover.

- Failure of the initial port test: If the *switchoverOnFailure* attribute is set to enabled, the operational attribute *standbyStatus* has the value available. Any failure of the initial port tests on the Ethernet port initiates a CP switchover.
- Failure of the steady state link: If there is an absence of traffic on the link for a period of more than 25 seconds, a time domain reflectometry (TDR) test is performed on the link. If the TDR test fails and the *switchoverOnFailure* and *standbyStatus* attributes are set to enabled and available respectively, a CP switchover occurs.

If either of these two error conditions occur, only one CP switchover happens. The operational attributes *activeStatus* and *standbyStatus* allow the port to keep track of the states of both OAM Ethernet ports so that the CP can correctly determine when a switchover is appropriate.

If *switchoverOnFailure* is enabled and *lp/0 oamenet standbyStatus* is set to available, an approximate two minute loss of Ethernet connectivity on both standby and active CP OAM Ethernet ports will trigger a CP switchover and an OAM Ethernet port initialization failure on the new active CP. The OAM Ethernet port will be locked and no other telnet connections can be established until you lock or unlock the active CP OAM Ethernet port.

If the OAM Ethernet port test fails during the initialization of an active CP, the CP Ethernet port will remain locked in the not available state even if the cause of the failure disappears. For example, if the Ethernet cable is disconnected and then reconnected, the CP Ethernet port will remain locked in the not available state.

Chapter 7
Function processor port test types

Passport provides two types of diagnostic port tests:

- Initial diagnostic tests ensure that ports are fault-free when they initialize. The system runs initial diagnostic tests on a port during its initial startup and whenever the port state changes to the unlocked state from the locked state. Initial diagnostic tests are fully automated and do not require operator intervention.
- Maintenance tests detect and isolate a problem with the port and its related facilities. You can run maintenance tests when you suspect there is a problem on a port. The tests verify that data is being transmitted and received properly along known segments of a link. Port tests calculate the number of frames transmitted and received, and calculate a bit error rate.

Passport supports four general types of port maintenance tests:

- card test: loops a test pattern through internal circuits of the function processor. This test verifies the function processor.
- local loop test: loops a test pattern through the local channel service unit (CSU) or modem. This test verifies the line interface but not the transmission facility.
- remote loop test: loops a test pattern through the remote CSU, modem, or port. This test verifies the full length of the transmission facility. Variations of this test include the remote loop tributary test (for testing a DS1 tributary on a DS3C function processor) and the V54 remote loopback test.

- manual loop test: sends test frames out the port. This test requires that you manually set up a loopback either locally or remotely. You can use this test to verify the full length of the transmission facility.

When you install a card and create the appropriate port components, *Test* subcomponents are also created. The basic procedures for running a maintenance port test involves setting attributes under the *Test* component, running the test, then examining the results. See “Testing ports and interfaces” (page 187) for more information.

Line automatic protection switching (line APS), a form of line-protection for optical cards, has a *test* component that is dynamically created when the *APS* component is provisioned. The *test* component under line APS replaces the Sonet or Sdh *test* component to which it is linked.

Not all processor cards support each test type. Some processor cards support customized tests. For information on which tests each processor card supports and procedures for performing diagnostic port tests, see “Tests for function processors” (page 115).

For more information on ports, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

See the following sections for information about maintenance tests on ports and related components:

- “Card loopback test” (page 105)
- “Local loopback test” (page 105)
- “Manual tests” (page 105)
- “Remote loopback tests” (page 108)
- “Remote loopthistrib test” (page 109)
- “V.54 remote loopback test” (page 110)
- “PN127 remote loopback test” (page 110)
- “O.151 OAM loopback test” (page 110)

Card loopback test

The card loopback test verifies the internal working of the FP. This test transmits a test pattern through the internal circuits and processors of the FP. Data is transmitted back from the link interface of the port. The test compares the pattern received to the pattern transmitted and calculates a bit error rate.

To set up the card test, set the *type* attribute under the *Test* component to card. See the procedure "Testing a port" (page 196).

Local loopback test

The local loopback test loops test data through the local CSU or modem. This test verifies the line interface up to but not including the facility. The local loopback test is supported on *X21* component and *HSSI* components.

When you start this test, the system sends a request to the local modem to loop back to the port being tested. The test then transmits a test pattern to the local modem as test data. At the end of the test, the system sends a request to the local modem to take down the loopback.

To set up the local loopback test, set the *type* attribute under the *Test* component to localLoop. See the procedure "Testing a port" (page 196).

Manual tests

Most port tests that test a line or facility set up their own loopbacks. The manual test requires you to arrange for a loopback to be inserted at some point along the connection. A loopback loops received data back to the FP being tested. Loopbacks do not produce test results for the local node because they loop received information back to the node being tested.

You can set up a physical loopback using a cable to cross-connect transmit and receive pins. Or, you can have an operator at the far-end set up a software loopback. The test compares the transmitted test pattern to the received test pattern and calculates a bit error rate.

> ***Note:*** For FPs with dual-FP APS, you can use the manual test using a physical loopback and manual test using an external loopback only if you have not provisioned line APS on the FP. If you have provisioned line APS on this FP, see "Testing ports and interfaces" (page 187).

Use the manual test to verify:

- the local interface, by using a physical loopback (such as a connector or cable). See “Manual tests using a physical loopback” (page 106).
- the line and far-end interface, by having an external loopback provisioned in software in the far-end equipment that verifies the transmission of frames. See “Manual tests using an external loopback” (page 106).
- the line and far-end interface, by having a payload loopback provisioned in software in the far-end equipment that removes data from the incoming frames and places the data on new outgoing frames. See “Manual tests using a payload loopback” (page 108).

Manual tests using a physical loopback

You can set up a physical loopback by inserting loopback equipment (such as a cable or connector) at any point on the link.

> ***Note:*** For FPs with dual-FP APS, you can use the manual test using a physical loopback only if you have not provisioned line APS on the FP. If you have provisioned line APS on this FP, see “Testing ports and interfaces” (page 187).

For some FPs, the loopback cable cross-connects the transmit and receive pins. See 241-1501-200 *Passport 15000, 20000 Hardware Description* for more information.

To set up the local node for this manual loopback test, set the *type* attribute under the *Test* component to manual. See “Testing ports and interfaces” (page 187).

Manual tests using an external loopback

The external loopback (also called line loopback or line testing) sets up a loopback on a far-end node to test ports on the local node or target card.

> ***Note:*** For FPs with dual-FP APS, you can use the manual test using an external loopback only if you have not provisioned line APS on the FP. If you have provisioned line APS on this FP, see “Testing ports and interfaces” (page 187).

The local node or target card is the location where the manual test is being performed. Whereas, the far-end card is the location where the software loopback is set-up. Test frames are transmitted from the target card to the far-end card and are transmitted back to the target card without modifying the data frames. Since the bit stream does not stop, the data does not leave the frame for processing. The external loopback produces test results at the local node only. The external loopback occurs at the following places:

- For the *Channel* component, the external loopback is established at the channel device. If you are testing a channel, the test frames only loop over the timeslots associated with that particular channel. Other timeslots on other *Channel* components do not loop.
- For the *DS1*, *E1*, *DS3*, *E3*, *Sonet*, *Sdh*, *Sts*, and *Aps* components, the external loopback is established at the line interface circuitry.

To set up the local node or target card for this manual loopback test,

- set the *type* attribute under the *Test* component to manual. See “Testing ports and interfaces” (page 187).
- ensure the duration of the manual test in this target card runs for a shorter period of time than the external loopback does in the far-end card. See “Testing ports and interfaces” (page 187).
- ensure the manual test starts after the loopback starts. See “Testing ports and interfaces” (page 187).

To set up an external loopback in the far-end card,

- set the *type* attribute under the *Test* component to externalLoop.
- ensure the duration of the external loopback is longer in this far-end card than the manual loopback test in the target card. See the procedure “Testing ports and interfaces” (page 187).
- ensure the external loopback starts before the manual loopback. See the procedure “Setting up a loopback” (page 204).

An external loopback is a passive test, therefore no test data is generated.

Manual tests using a payload loopback

The payload loopback sets up a loopback on a far-end node to test ports on the local node or target card. The local node or target card is the location where the manual test is being performed. The far-end card is the location where the software loopback is set up.

The payload loopback terminates the incoming frames, removes the data from the incoming frames, and places the data on new outgoing frames, which it sends back to the node being tested. The payload loopback produces test results at the local node only.

To set up the local node or target card for this manual loopback test,

- set the *type* attribute under the *Test* component to manual. See “Testing ports and interfaces” (page 187).
- ensure the duration of the manual test in this target card runs for a shorter period of time than the payload loopback does in the far-end card. See “Testing ports and interfaces” (page 187).
- ensure the manual test starts after the loopback starts. See “Testing ports and interfaces” (page 187).

To set up a payload loopback in the far-end card,

- set the *type* attribute under the *Test* component to payloadLoop.
- ensure the duration of the payload loopback is longer in this far-end card than the manual loopback test in the target card. See the procedure “Setting up a loopback” (page 204).
- ensure the payload loopback starts before the manual loopback. See the procedure “Setting up a loopback” (page 204).

A payload loopback is a passive test, therefore no test data is generated.

Remote loopback tests

You can use the remote loopback test to test the full length of the facility. There are three types of remote loopback tests:

- “DS1 remote loopback tests” (page 109)
- “DS3 remote loopback tests” (page 109)

- “X21 remote loopback tests” (page 109)

To set up the remote loopback test, set the *type* attribute under the *Test* component to *remoteLoop*. See the procedure “Testing a port” (page 196).

DS1 remote loopback tests

On the DS1 port, a repeated bit pattern (00001) is sent out of the link to request the far-end channel service unit (CSU) to set up a remote loopback. Then the specified test pattern is transmitted to the remote CSU as test data. At the end of the test, the *Test* component automatically requests the remote loop to be taken down by sending another repeated bit pattern (001).

DS3 remote loopback tests

On the DS3 port, the local node sends a line loopback activate signal (carried over C-bits) over the link to force the remote DS3 port to loop the signal. The loopback remains in effect until the local node sends a line loopback deactivate signal over the link. The DS3 remote loop test is supported only when using the DS3 C-bit parity framing mode (the DS3 *cbitParity* attribute must be set to *on*). With this attribute setting, the *DS3* component also responds to a remote test request.

X21 remote loopback tests

The X21 remote loop test requests the remote modem to loop frames back to the port. The system then transmits a specified test pattern to the remote modem as test data. At the end of the test, the *test* component automatically requests the remote loop to be taken down. The X21 component must be configured as DTE for the remote loop test to run properly.

Remote loopthistrib test

You can use the remote loopthistrib test to test the full length of the facility. This test enables you to test tributary DS1 ports beneath a DS3 or a tributary E1 port beneath a Vc4.

On the DS3 port, a DS1 line loopback activate signal (carried over C-bits) travels over the DS3 link and forces a remote *DS1* component to loop the DS1 signal. The loopback stays until the system sends a DS1 line loopback deactivate signal. This test is supported only when using the DS3 C-Bit parity framing mode (the DS3 *cbitParity* attribute must be set to ***on***).

To set up the remote loopthistrib test, set the *type* attribute under the *Test* component to *remoteLoopThisTrib*. See “Testing ports and interfaces” (page 187).

V.54 remote loopback test

You can use the V.54 remote loopback test to test the full length of the facility. The V.54 test enables you to test a single DS1 or E1 channel on a channelized port. You can test a single channel on a port without affecting the traffic on any other channels.

To set up the V.54 remote loopback test, set the *type* attribute under the *Test* component to v54RemoteLoop. See the procedure “Testing a port” (page 196).

PN127 remote loopback test

You can use the PN127 remote loopback test to test the full length of the facility. The PN127 test enables you to test a single channel on an E1 port. Therefore, you can test a channel on a port without affecting the traffic on any other channels. As well, the E1 MSA32 FP can run the PN127 test on multiple channels and multiple timeslots simultaneously.

> ***Note:*** To run the PN127 test, the connection to the NTU must be up and running and must support PN127.

Individual FPs support the PN127 remote loopback test differently. See “Card testing” (page 45) for information about supported configurations.

O.151 OAM loopback test

Nippon Telegraph and Telecommunications (NTT) requires that any service provider connecting to the NTT network be capable of looping back proprietary operations, administration, and maintenance (OAM) cells to test its network, and to diagnose detected faults. Any company wishing to access the NTT network with their equipment must pass the NTT loopback test. The NTT proprietary test is referred to as the O.151 OAM loopback.

The O.151 OAM loopback cells differ from the standard I.610 OAM cells of the International Telecommunications Union Telecommunications (ITU-T) by lacking the cyclic redundancy check (CRC) at the end of each cell and by having a proprietary OAM Type. Normally, all O.151 cells would be discarded by a Passport 15000 16-port OC-3/STM-1 card (with PEC NTHW21 and NTHW31) because they lack the CRC. To prevent the discard, and to allow normal traffic to pass through the same port as the loopback test, Nortel Networks provides a 16-port OC-3/STM-1 ATM card with modified firmware. The modified card is identified by the product engineering code (PEC) NTHW24.

Overview of the NTT proprietary loopback test

NTT uses the proprietary loopback cells for pre-cutover testing and fault analysis after a failure has been detected on a virtual channel (VC) or virtual path (VP). The pre-cutover period refers to the time prior to having the connection cut over from configuring (provisioning) and testing to live service in a public network.

The characteristics of the O.151 OAM loopback cell are:

- the OAM Type = 3
- there is no CRC
- it is segment-based (as opposed to end-to-end)
- the data portion of the cell contains a special polynomial
- it is available in both F4 and F5 formats
- the OAM function = 0 (zero)

Enabling the NTHW24 card to loop back the O.151 cells requires temporary configuration of Passport to loop on the fabric the VC or VP under test.

Running the test requires coordination between the service provider and NTT. The high-level approach to preparing to set up a loopback test is as follows. Refer also to the figure “The typical schedule of a loopback test” (page 112).

1 The service provider or NTT requests a new connection and schedules a period to run the test.

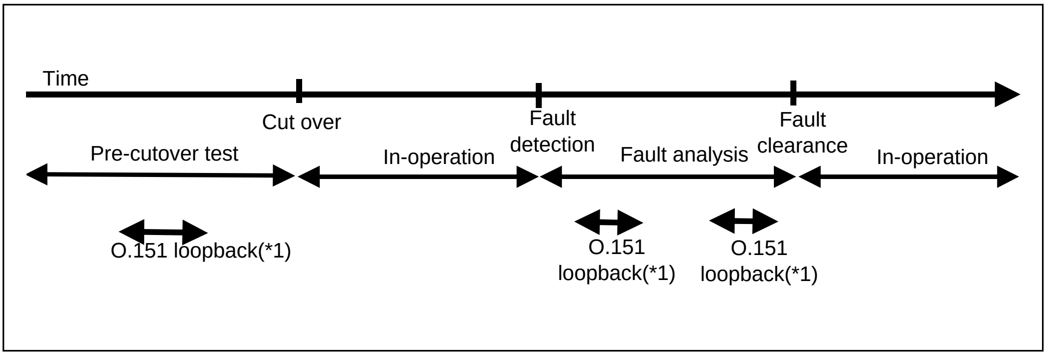
2 The service provider configures their software and equipment to loop back the proprietary cells.

3 NTT starts and stops the O.151 test and reports success or failure to the service provider. The test period (the *1 in the figure) runs O.151 OAM cells.

4 After a successful test, the service provider re-configures its software in preparation for in-service operation.

5 After the equipment has been in-service and a fault is detected, the service provider must remove the connection from service and re-configure it to run the O.151 test again.

Figure 11
The typical schedule of a loopback test



The expected behavior of cells during the various phases of integrating the OAM loopback test into a connection is identified in the table "Cell behavior during and after the loopback test" (page 112).

Table 12
Cell behavior during and after the loopback test

Cell type for VP or VC	Pre-cutover test	In-operation	Fault analysis
O.151	looped back	none while the test is stopped	looped back
AIS/RDI	none during the test period	normal operation	none during this period
LB (I.610)	none during this period	normal operation	none during this period

While other connections on the port are active and in service, only the path or connection under test is out of service for the duration of the test. No user traffic can be carried by the VP or VC under test.

- In the figure “The loopback test on a VP” (page 113), the virtual path (VP) is out of service on VPI=xxx and VCI=3 while the port through which it passes is still in service.
- In the figure “The loopback test on a VC” (page 114), the virtual connection (VC) is out of service on VPI=xxx and VCI=aa while the VP through which it passes is still in service.

Figure 12
The loopback test on a VP

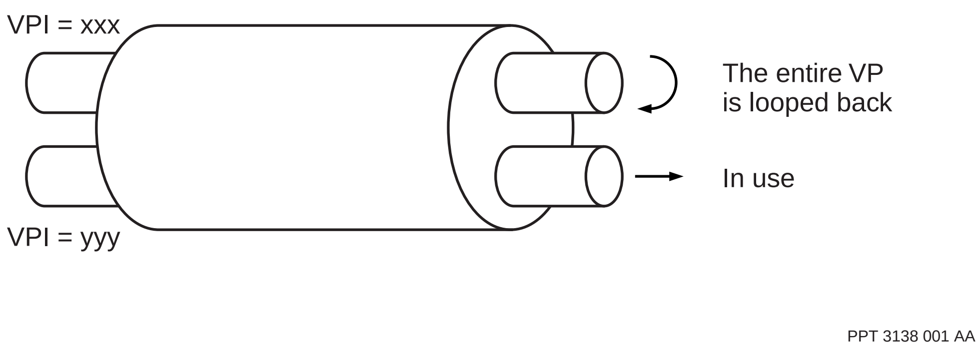
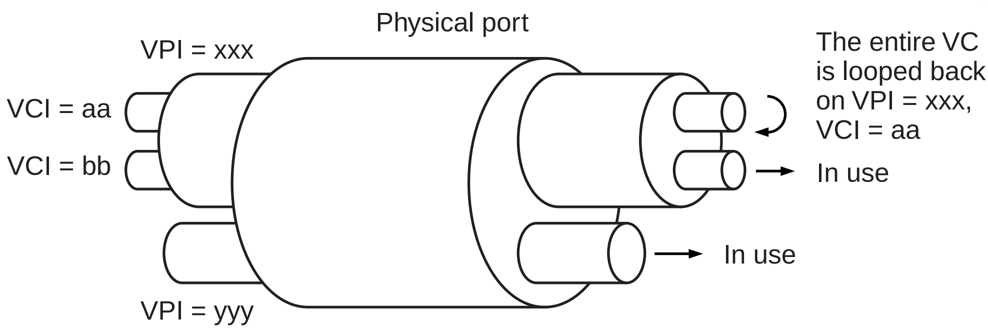


Figure 13
The loopback test on a VC



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Chapter 8
Tests for function processors

Passport function processors (FPs) support a variety of port test. For a description of each type of test see “Function processor port test types” (page 103). Each FP have special considerations for the way the port test functions. See the sections below for details on the specific functioning of each FP.

Tests for Passport 7400 function processors

This section describes the specific diagnostic tests which can be performed by each family of Passport 7400 function processor (FP).

Passport 7400 DS1 FP tests

Table 13
Passport 7400 DS1 FP tests

Card type	Port	Type of loopback test							Additional Considerations
		Card	**manual**	**remoteLoop**	**externalLoop**	**payloadLoop**	**v54RemoteLoop**	**pn127RemoteLoop**	
4-port DS1	DS1	X	X	X	X				“4-port DS1 FP tests additional considerations” (page 117)
	Chan	X	X		X				
8-port DS1	DS1	X	X	X	X				“8-port DS1 FP tests additional considerations” (page 118)
	Chan	X	X		X				
DS1C	DS1	X	X		X				“DS1C FP tests additional considerations” (page 119)
	Chan	X	X		X		X		
3-port DS1 ATM	DS1	X	X	X	X	X			“3-port DS1 ATM FP tests additional considerations” (page 124)
8-port DS1 ATM	DS1	X	X	X	X	X			“8-port DS1 ATM FP tests additional considerations” (page 125)
4-port DS1 AAL1	DS1	X	X	X	X				
	Chan	X				X			
DS1 MSA32	DS1	X	X	X	X	X			“DS1 MSA32 FP tests additional considerations” (page 126)
	Chan		X			X	X	X	
(Sheet 1 of 2)									

Table 13 (continued)
Passport 7400 DS1 FP tests

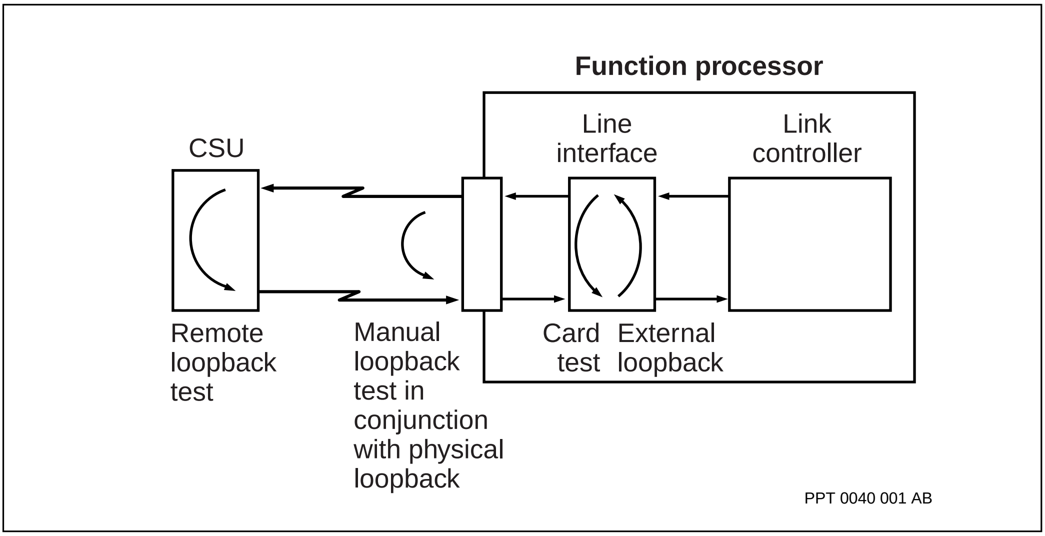
Card type	Port	Type of loopback test							Additional Considerations
		Card	manual	remoteLoop	externalLoop	payloadLoop	v54RemoteLoop	pn127RemoteLoop	
	DS1								
DS1 MVP-E	DS1	X	X		X	X			“DS1 MVP-E FP tests additional considerations” (page 128)
(Sheet 2 of 2)									

4-port DS1 FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - — Make sure the loop lengths are within the required range and the *lineLength* attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).
- “Manual tests using an external loopback” (page 106):
  - — The external loopback is established at the line interface circuitry.

The figure “Data paths for 4-port DS1 FP port tests and loopbacks” (page 118) shows the data path for each test and loopback.

Figure 14
Data paths for 4-port DS1 FP port tests and loopbacks

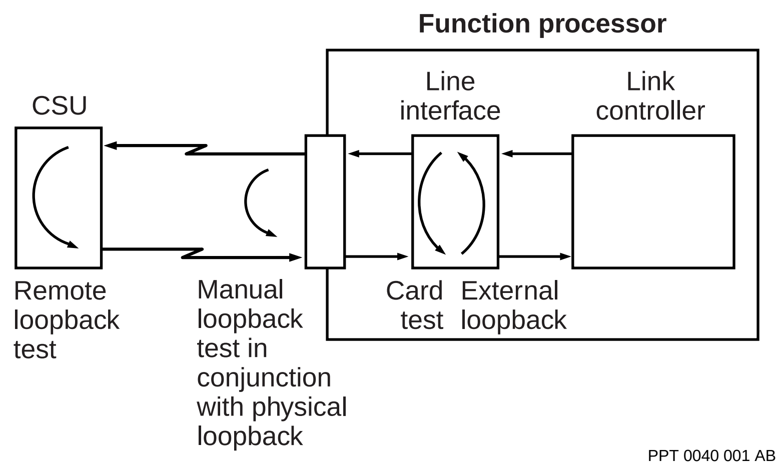


8-port DS1 FP tests additional considerations

- “Manual tests” (page 105):
  - Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).
- “Manual tests using an external loopback” (page 106):
  - External loopback is established at the line interface circuitry.

The figure “Data paths for 8-port DS1 FP port tests and loopbacks” (page 119) shows the data path for each test and loopback.

Figure 15
Data paths for 8-port DS1 FP port tests and loopbacks



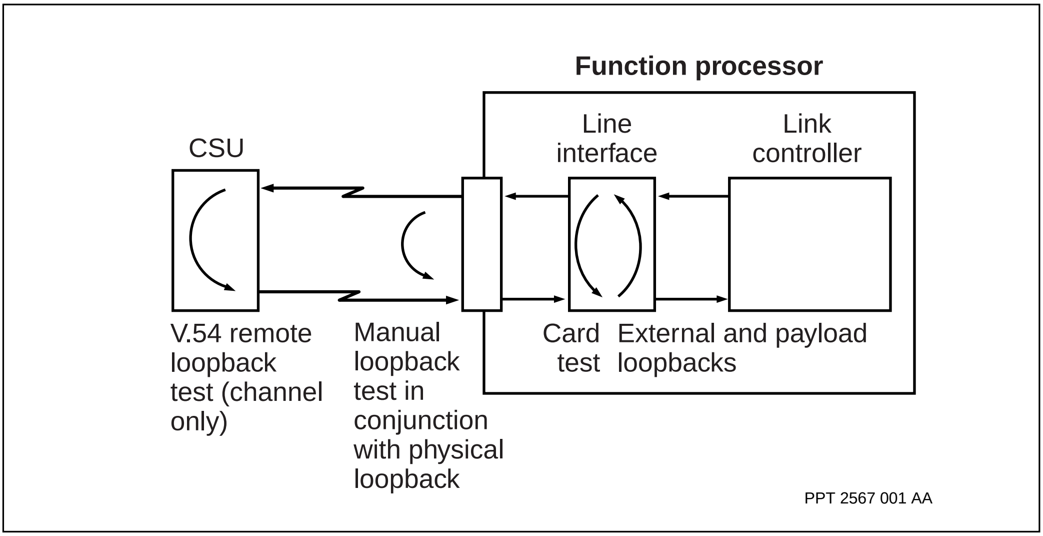
DS1C FP tests additional considerations

- “Card loopback test” (page 105):
  - You can only test one channel component at a time.
- “Manual tests” (page 105):
  - Make sure the loop lengths are within the required range and the *lineLength* attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).
- “Manual tests using an external loopback” (page 106):
  - External loopback is established at the line interface circuitry.
- “V.54 remote loopback test” (page 110):
- See
  - “V.54 remote loopback testing on a DS1C FP” (page 120) for more information about the V.54 remote loopback test on the DS1C FP
  - The DS1C FP supports V.54 remote loopback for 64 kbit/s and 56 kbit/s timeslot data rates, depending on the network

configuration. Before you run a test, make sure the FP is provisioned to support the timeslot data rate expected by the far-end circuit termination equipment. See “DS1C FP in a fractional T1 network configuration” (page 121) for more information about supported configurations.

The figure “Data paths for DS1C FP port tests and loopbacks” (page 120) shows the data path for each port test and loopback.

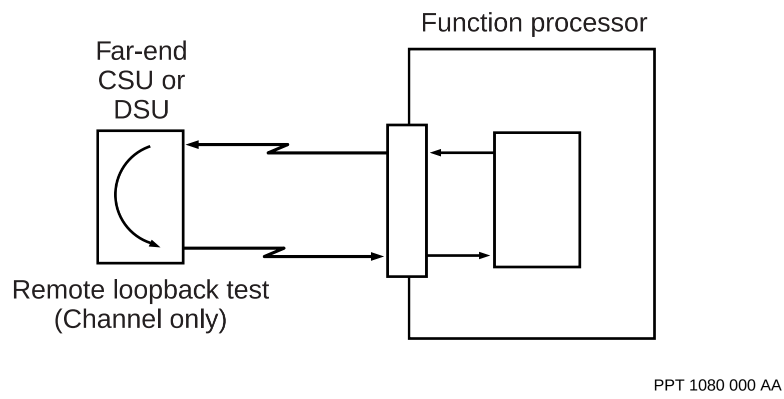
Figure 16
Data paths for DS1C FP port tests and loopbacks



V.54 remote loopback testing on a DS1C FP

To test a channel on a channelized DS1 FP, the connection to the CSU/DSU must be up and running as shown in the figure “V.54 remote loopback test on a channelized DS1 FP” (page 121). Individual FPs support the V.54 remote loopback test differently.

Figure 17
V.54 remote loopback test on a channelized DS1 FP



DS1C FP in a fractional T1 network configuration

The table “Summary of V.54 supported and unsupported items for the DS1C FP” (page 122) describes how a DS1C FP supports the V.54 remote loopback test.The figures “DS1C to a fractional T1 network configuration” (page 123) and “DS1C to a DDS network configuration” (page 124) show network configurations supported by the DS1C FP. The DS1C FP does not respond to loop up and loop down requests from the far end.

Table 14
Summary of V.54 supported and unsupported items for the DS1C FP

Network configuration	Supported	Unsupported
DS1C to a fractional T1 network (see "DS1C to a fractional T1 network configuration" (page 123))	One nx64 kbit/s (n = 1 to 24) Chan component with B8ZS line coding and ESF framing format running one V.54 test on each port	One nx64 kbit/s (n = 1 to 24) Chan component with AMI line coding and ESF or D4 framing format
	One nx56 kbit/s (N = 1 to 24) Chan component with B8ZS/AMI line coding and ESF/D4 framing format running one V.54 test on each port	
	V.54 loopback test can be initiated from one Chan component on each DS1C port without affecting traffic on other channels off the same port	
DS1C to a DDS network (see "DS1C to a DDS network configuration" (page 124))	DDS customer primary channel data rate of 64 kbit/s (clear channel), 72.0 kbit/s OCU/loop data rate, a DS1configuration of B8ZS line coding, and ESF framing format	DS1C does not respond to or transport DDS network control codes
DS1C to a DDS network (see "DS1C to a DDS network configuration" (page 124))	DDS customer primary channel data rate of 56 kbit/s, 56 kbit/s OCU/loop data rate, a DS1 configuration of B8ZS line coding and ESF framing format	DDS secondary channel signalling either standard or proprietary
	Supports only 56 kbit/s and 64 kbit/s customer primary channel data rate	
Applicable to a DS1C to a fractional T1 network and DS1C to a DDS network	DS1C sends V.54 loop-up and loop-down patterns to remote DSI as part of one V.54 test cycle	DS1C does not respond to V.54 loop-up and loop-down patterns that are generated externally
(Sheet 1 of 2)		

Table 14 (continued)
Summary of V.54 supported and unsupported items for the DS1C FP

Network configuration	Supported	Unsupported
	Maximum one V.54 test per DS1C port at a time	DS1C ignores V.54 acknowledgement signalling
	Maximum four simultaneous V.54 tests on each DS1C card so there is one V.54 test running on each port	
(Sheet 2 of 2)		

Figure 18
DS1C to a fractional T1 network configuration

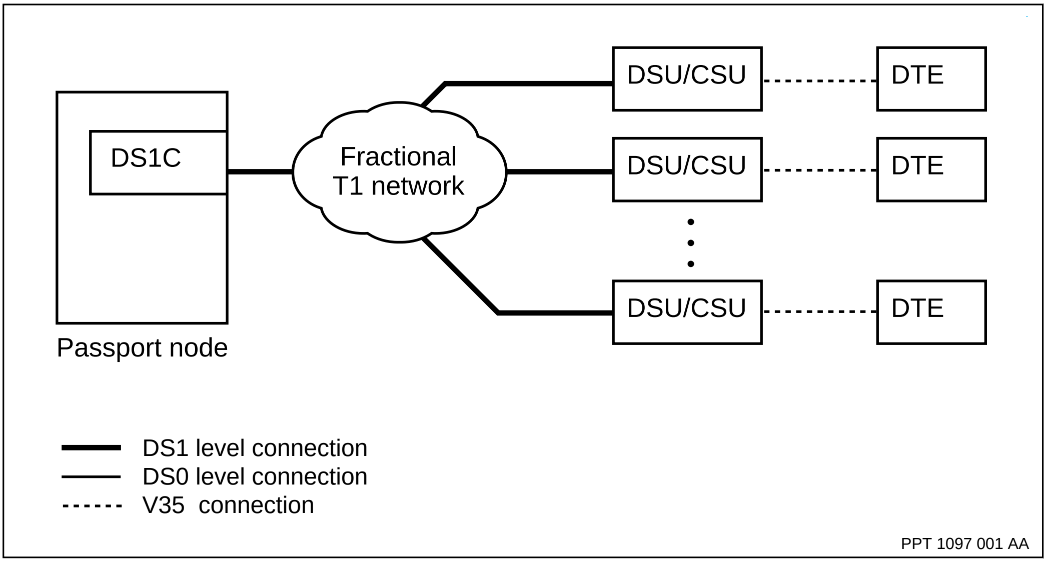
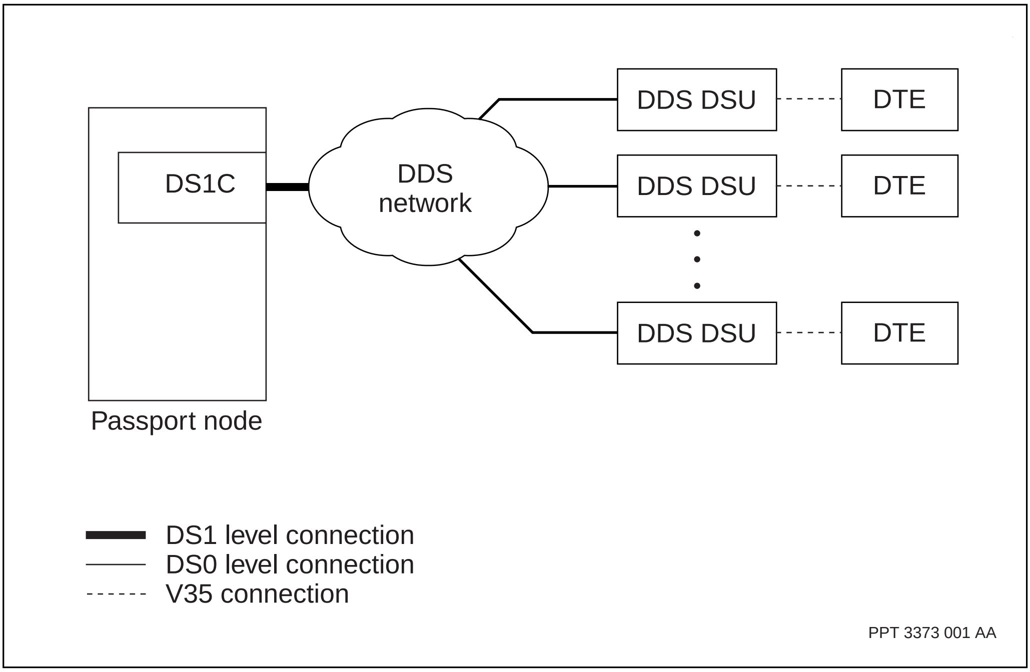


Figure 19
DS1C to a DDS network configuration



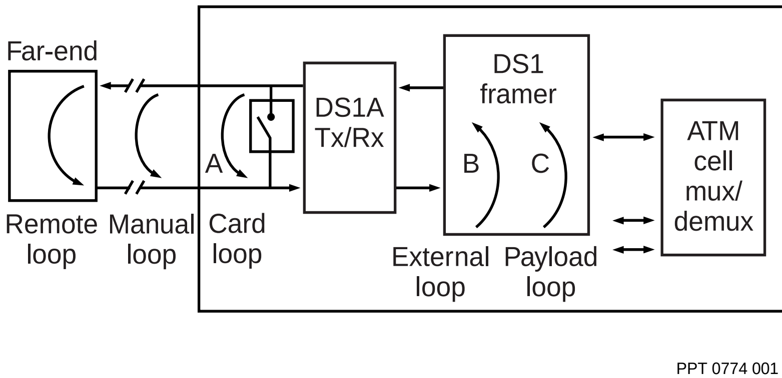
3-port DS1 ATM FP tests additional considerations

- “Manual tests” (page 105):
  - Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).
- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the line interface circuitry.
- “Manual tests using a payload loopback” (page 108):
  - This test operates with the clockingSource attribute set to module or local.
- “Remote loopback tests” (page 108):

— On the DS1 port, a repeated bit pattern (00001) is sent out of the link to request the far-end CSU to set up a remote loopback. Then the specified test pattern is transmitted to the remote CSU as test data. At the end of the test, the Test component automatically takes down the remote loop by sending another repeated bit pattern (001).

The test configurations are illustrated in the figure “Data paths for DS1 ATM FP port tests and loopbacks” (page 125).

Figure 20
Data paths for DS1 ATM FP port tests and loopbacks



8-port DS1 ATM FP tests additional considerations

Eight-port DS1 ATM FPs support card, manual and remote loopback tests only if the port has a provisioned link to an *AtmIf* component. Ports linked directly to *AtmIf* components are independent links, as opposed to ports that are part of an IMA link group. For information about the difference between IMA links and independent links, see 241-5701-730 *Passport 7400, 15000, 20000 Inverse Multiplexing for ATM Guide*.

- “Manual tests” (page 105):
  — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped

signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).

- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the line interface circuitry.
- “Manual tests using a payload loopback” (page 108):
  - This test operates with the *clockingSource* attribute set to module or local.

DS1 MSA32 FP tests additional considerations

The DS1 MSA32 FP uses hardware to generate a continuous constant bit rate (CBR) pattern instead of using a software-generated series of frames to test error bit rates on the line. The CBR pattern can be customized or a standard pseudo-random bit sequence or pattern (PRBS). Hardware-generated CBR patterns allow complete testing of the line because the FP can then detect all bit errors. With software-generated test patterns, the FP only detects bit errors if they occur within the frame containing the PRBS pattern.

For framed line types, the FP generates the continuous CBR pattern within the framing on the line. For unframed line types, the FP generates the CBR pattern over the full port bandwidth.

The DS1 MSA32 FP also uses hardware to evaluate the bit test stream that is returned.

See the table “Port and channel test types supported on DS1 MSA32 FP” (page 126) for information about supported test types.

Table 15
Port and channel test types supported on DS1 MSA32 FP

Test type	Supported on port	Supported on channel	Performs pattern test
card	yes	no	yes
manual	yes	yes	yes
externalLoop	yes	no	no
(Sheet 1 of 2)			

Table 15 (continued)
Port and channel test types supported on DS1 MSA32 FP

Test type	Supported on port	Supported on channel	Performs pattern test
payloadLoop	yes	yes	no
remoteLoop	yes	no	yes
(Sheet 2 of 2)			

Because of these particularities, the DS1 MSA32 FP has some unique behaviors for port testing, as explained in the following sections:

- “Clock synchronization” (page 127)
- “Test setup and result attributes” (page 127)
- “Interpreting test results” (page 128)

Clock synchronization

The PRBS patterns used by the DS1 MSA32 FP are subject to the same constraints as framed traffic on the access ports. This means that to prevent frame slips from occurring, you must configure the *clockingSource* attribute to module when doing port tests on framed line types on the DS1 MSA32 FP. This sets the clock of the active CP as the source of the transmit clock for the DS1 line and ensures that the received data and transmitted data have the same clock as the DS1 MSA32 FP.

Because of the nature of PRBS, if a frame slip occurs and pattern synchronization is lost, the DS1 MSA32 FP cannot resynchronize to the pattern and a patternSynchLost condition is declared. See “Interpreting test results” (page 128)) if this happens.

For unframed line types, you can configure a local, line or module clocking source.

Test setup and result attributes

Because the DS1 MSA32 FP does not use software-generated frames:

- the *frmsize* attribute of the test setup component is redundant
- the *frmTx*, *frmRx* and *erroredFrmRx* attributes of the test result component are redundant and should be set to 0

Interpreting test results

On the DS1 MSA32 FP, Passport terminates a test on framed line types as a patternSynchLost condition when the received bit errors rise to a level of greater than 1%. A patternSynchLost condition is declared, terminating the test, if either of the two following situations occur:

- A line is error-free but a configuration error causes frame slips. The FP is unable to resynchronize after a frame slip, causing the test to terminate. In this situation, the test results show a bit error rate of zero and the termination cause as patternSynchLost, indicating that the last sample had a bit error rate of greater than 1% due to the frame slip.
- A line has bit error rates of less than 1% but rises to greater than 1% at some points, possibly due to electrical problems in a cable. In this situation, the test results show a bit error rate of less than 1% but the termination cause is shown as patternSynchLost because the last sample had a bit error rate of greater than 1%.

To avoid these types of situations when running framed line types, ensure that you have configured your clocking source correctly. For information on clocking source, see “Clock synchronization” (page 127).

DS1 MVP-E FP tests additional considerations

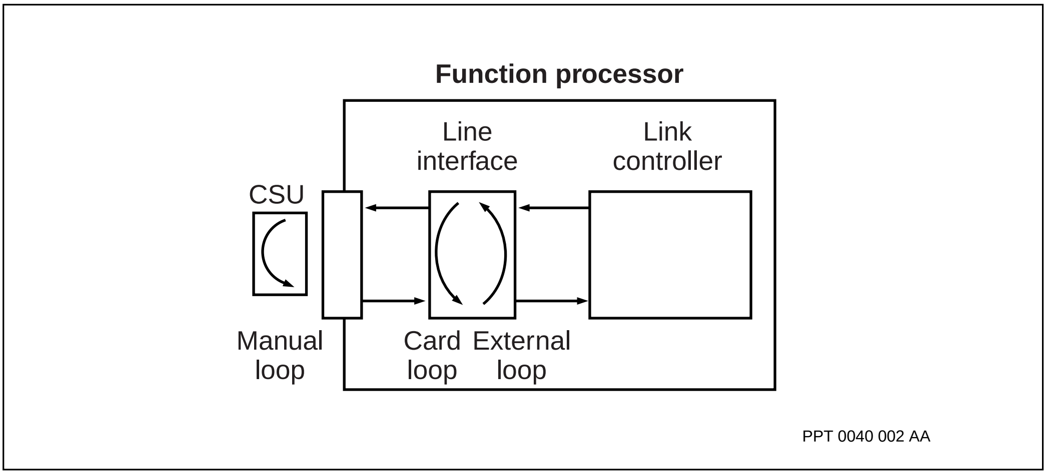
The *frmSize* attribute cannot exceed 1024 when you run diagnostic tests on the DS1 MVP-E FP. The DS1 MVP-E loop tests cannot run on a channel associated with timeslot 25 when the *linetype* attribute is set to CAS.

- “Manual tests” (page 105):
  - — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).
- “Manual tests using an external loopback” (page 106):
  - — The external loopback is established at the line interface circuitry.

Note: Nortel Networks recommends against performing a channel test on the 4-port DS1 MVP-E FP while in service. Performing the channel test on this FP results in a loss of frame (LOF) alarm appearing on the port to which the tested channel belongs. The LOF condition is a red alarm that causes all the channels on the port to fail momentarily. The channels and voice services recover after the LOF is cleared during the course of the test.

The test configurations are illustrated in the figure “Data paths for DS1 MVP-E port tests and loopbacks” (page 129).

Figure 21
Data paths for DS1 MVP-E port tests and loopbacks



Passport 7400 E1 FP tests

Table 16
Passport 7400 E1 FP tests

Card type	Port	Type of loopback test						Additional Considerations
		Card	manual	externalLoop	payloadLoop	v54RemoteLoop	pn127RemoteLoop	
4-port E1	E1	X	X	X				“4-port E1 FP tests additional considerations” (page 130)
	Chan	X	X	X				
E1C	E1	X	X	X				“E1C FP tests additional considerations” (page 131)
	Chan	X	X	X		X	X	
3-port E1 ATM	E1	X	X	X	X			“3-port E1 ATM FP tests additional considerations” (page 134)
8-port E1ATM	E1	X	X	X	X			“8-port E1 ATM FP tests additional considerations” (page 135)
E1 AAL1	E1	X	X	X				“E1 AAL1 FP tests additional considerations” (page 136)
	Chan	X			X		X	
E1 MSA32	E1	X	X	X	X			“E1 MSA32 FP tests additional considerations” (page 136)
	Chan	X			X	X	X	
E1 MVP-E	E1	X	X	X	X			“E1 MVP-E FP tests additional considerations” (page 138)
32-port E1 TDM	E1	X	X	X	X			“32-port E1 TDM FP tests additional considerations” (page 139)

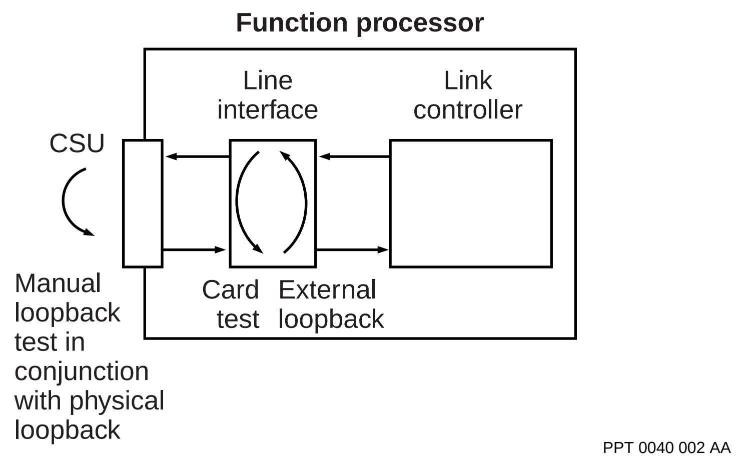
4-port E1 FP tests additional considerations

- “Manual tests using an external loopback” (page 106):

— The external loopback is established at the line interface circuitry.

The figure “Data paths for 4-port E1 FP port tests and loopbacks” (page 131) shows the data path for each test and loopback.

Figure 22
Data paths for 4-port E1 FP port tests and loopbacks



E1C FP tests additional considerations

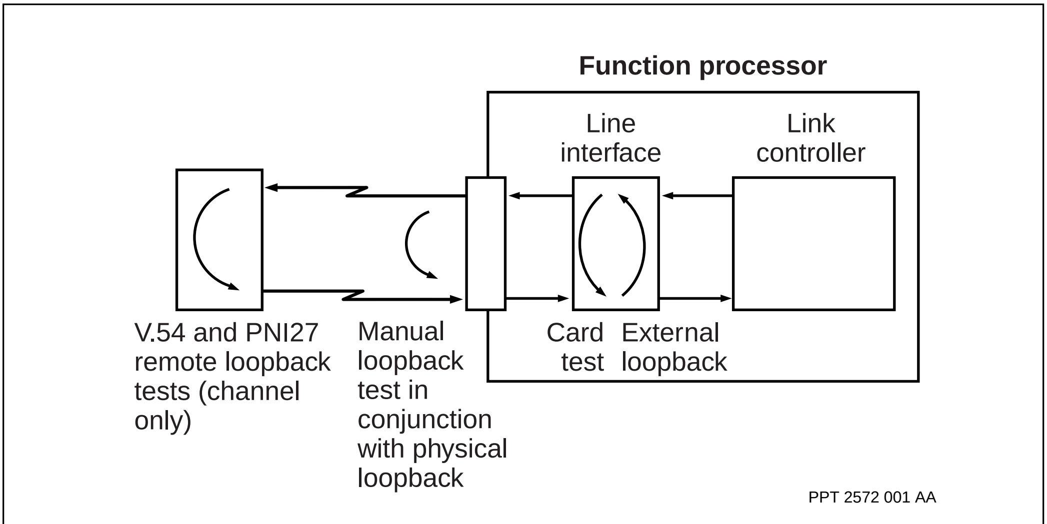
- “Manual tests using an external loopback” (page 106):
  - — External loopback is established at the line interface circuitry. The external loopback must be established before the manual loopback is started. Incoming frames to the port may not be acknowledged if the external loopback is applied after the manual loopback has begun.
- “V.54 remote loopback test” (page 110)
  - — See “V.54 remote loopback testing on a E1C FP” (page 132) for more information about the V.54 remote loopback test on the E1C FP.
  - — The E1C FP supports V.54 remote loopback tests for nx64 kbit/s timeslot data rates using CCS framing. These test do no support data

rates lower than 64 kbit/s. You can run up to four V.54 or PN127 remote loopback tests (on test on each port) simultaneously.

— Before you run a test, make sure the FP is provisioned to support the timeslot data rate expected by the far-end circuit termination equipment. See “E1C FP in a fractional E1 network configuration” (page 133) for more information about supported configurations.

The figure “Data paths for E1C FP port tests and loopbacks” (page 132) shows the data path for each test and loopback.

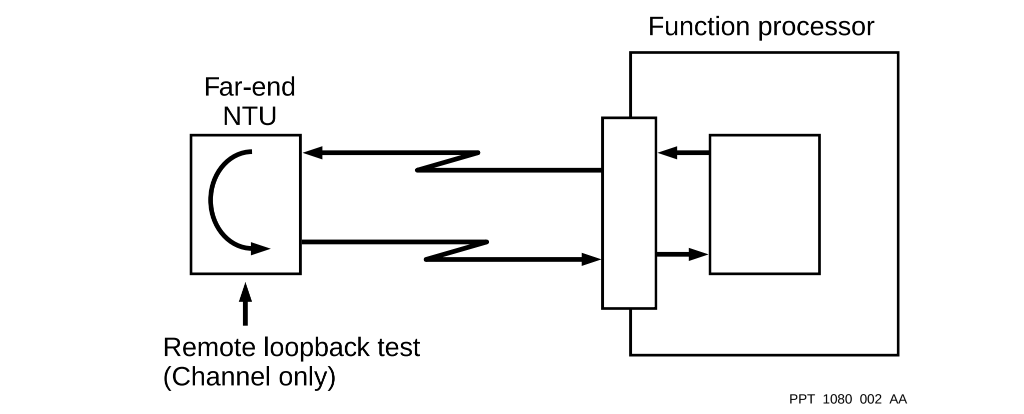
Figure 23
Data paths for E1C FP port tests and loopbacks



V.54 remote loopback testing on a E1C FP

To test a channel on an E1 FP, the connections to the NTU must be up and running as shown in the figure “V.54 remote loopback test on a channelized E1 FP” (page 133).

Figure 24
V.54 remote loopback test on a channelized E1 FP



E1C FP in a fractional E1 network configuration

The table “Summary of V.54 supported and unsupported items for the E1C FP” (page 133) describes how a E1C FP supports the V.54 remote loopback test.The figure “E1C to a fractional E1 network configuration” (page 134) shows the configuration of the E1C to a fractional E1 network.

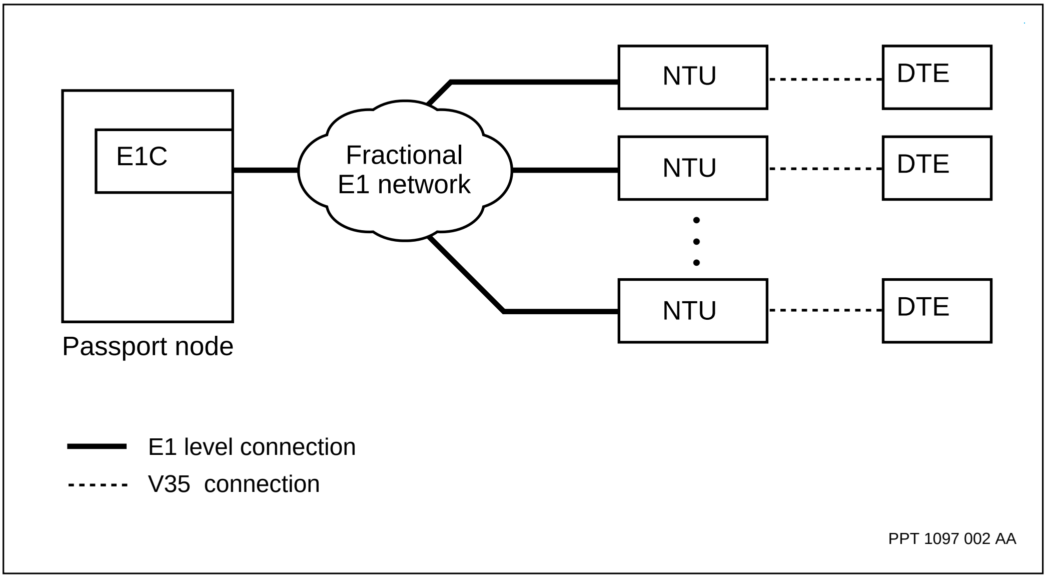
Table 17
Summary of V.54 supported and unsupported items for the E1C FP

Network configuration	Supported	Unsupported
E1C to a fractional E1 network (see “E1C to a fractional E1 network configuration” (page 134))	One nx64 kbit/s (n = 1 to 24) Chan component using CCS framing format running one V.54 test on each port	One nx64 kbit/s (n = 1 to 24) Chan component with AMI line coding and ESF or D4 framing format
Applicable to a E1C to a fractional E1 network	E1C sends V.54 loop-up and loop-down patterns to remote DSI as part of one V.54 test cycle	E1C does not respond to V.54 loop-up and loop-down patterns that are generated externally
(Sheet 1 of 2)		

Table 17 (continued)
Summary of V.54 supported and unsupported items for the E1C FP

Network configuration	Supported	Unsupported
	Maximum one V.54 test per E1C port at a time	E1C ignores V.54 acknowledgement signalling
	Maximum four simultaneous V.54 tests on each E1C card so there is one V.54 test running on each port	
(Sheet 2 of 2)		

Figure 25
E1C to a fractional E1 network configuration



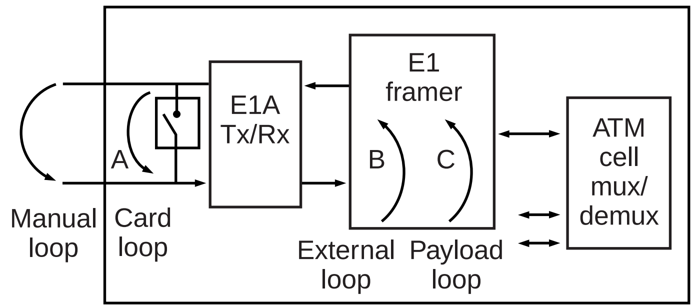
3-port E1 ATM FP tests additional considerations

- "Manual tests using an external loopback" (page 106):
  — The external loopback is established at the line interface circuitry.
- "Manual tests using a payload loopback" (page 108):

— This test operates with the *clockingSource* attribute set to module or local. During the test, the DS3 frames (physical level) stop and the payload data loops over the link controller device.

The figure “Data paths for 3-port E1 ATM FP port tests and loopbacks” (page 135) shows the data path for each test and loopback.

Figure 26
Data paths for 3-port E1 ATM FP port tests and loopbacks



8-port E1 ATM FP tests additional considerations

Eight-port E1 ATM FPs support card, manual and remote loop tests only if the port has a provisioned link to an *AtmIf* component. Ports linked directly to *AtmIf* components are independent links, as opposed to ports that are part of an IMA link group. For information about the difference between IMA links and independent links, see 241-5701-730 *Passport 7400, 15000, 20000 Inverse Multiplexing for ATM Guide*.

- “Manual tests” (page 105):

  — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS1 cannot exceed 223 m (655 ft).

- “Manual tests using an external loopback” (page 106):

— The external loopback is established at the line interface circuitry.

- “Manual tests using a payload loopback” (page 108):

  — This test operates with the *clockingSource* attribute set to module or local.

E1 AAL1 FP tests additional considerations

- “PN127 remote loopback test” (page 110):

  — The E1 AAL1 FP supports this test only when the E1 signal is structured. If a channel contains more than one timeslot, each timeslot is tested in sequence. You can run only one PN127 on an E1 AAL1 FP at a time.

E1 MSA32 FP tests additional considerations

The E1 MSA32 FP uses hardware to generate a continuous constant bit rate (CBR) pattern instead of using a software-generated series of frames to test error bit rates on the line. The CBR pattern can be customized or a standard pseudo-random bit sequence or pattern (PRBS). Hardware-generated CBR patterns allow complete testing of the line because the FP can then detect all bit errors. With software-generated test patterns, the FP only detects bit errors if they occur within the frame containing the PRBS pattern.

For framed line types, the FP generates the continuous CBR pattern within the framing on the line. For unframed line types, the FP generates the CBR pattern over the full port bandwidth.

The E1 MSA32FP also uses hardware to evaluate the bit test stream that is returned.

See the table “Port and channel test types supported on MSA32 E1 FPs” (page 137) for information about supported test types.

Table 18
Port and channel test types supported on MSA32 E1 FPs

Test type	Supported on port	Supported on channel	Performs pattern test
card	yes	no	yes
manual	yes	yes	yes
externalLoop	yes	no	no
payloadLoop	yes	yes	no
v54RemoteLoop	no	yes	yes
pn127RemoteLoop	no	yes	yes

Because of these particularities, the E1 MSA32 FP has some unique behaviors for port testing, as explained in the following sections:

- “Clock synchronization” (page 137)
- “Test setup and result attributes” (page 138)
- “Interpreting test results” (page 138)

Clock synchronization

The PRBS patterns used by the E1 MSA32 FP are subject to the same constraints as framed traffic on the access ports. This means that to prevent frame slips from occurring, you must configure the *clockingSource* attribute to module when doing port tests on framed line types on the E1 MSA32 FP. This sets the clock of the active CP as the source of the transmit clock for the DS1 line and ensures that the received data and transmitted data have the same clock as the E1 MSA32 FP.

Because of the nature of PRBS, if a frame slip occurs and pattern synchronization is lost, the E1 MSA32 FP cannot resynchronize to the pattern and a patternSynchLost condition is declared. See “Interpreting test results” (page 138) if this happens.

For unframed line types, you can configure a local, line or module clocking source.

Test setup and result attributes

Because the E1 MSA32 FPs does not use software-generated frames:

- the *frmsize* attribute of the test setup component is redundant
- the *frmTx*, *frmRx* and *erroredFrmRx* attributes of the test result component are redundant and should be set to 0

Interpreting test results

On the E1 MSA32 FP, Passport terminates a test on framed line types as a patternSynchLost condition when the received bit errors rise to a level of greater than 1%. A patternSynchLost condition is declared, terminating the test, if either of the two following situations occur:

- A line is error-free but a configuration error causes frame slips. The FP is unable to resynchronize after a frame slip, causing the test to terminate. In this situation, the test results show a bit error rate of zero and the termination cause as patternSynchLost, indicating that the last sample had a bit error rate of greater than 1% due to the frame slip.
- A line has bit error rates of less than 1% but rises to greater than 1% at some points, possibly due to electrical problems in a cable. In this situation, the test results show a bit error rate of less than 1% but the termination cause is shown as patternSynchLost because the last sample had a bit error rate of greater than 1%.

To avoid these types of situations when running framed line types, ensure that you have configured your clocking source correctly. For information on clocking source, see “Clock synchronization” (page 137).

E1 MVP-E FP tests additional considerations

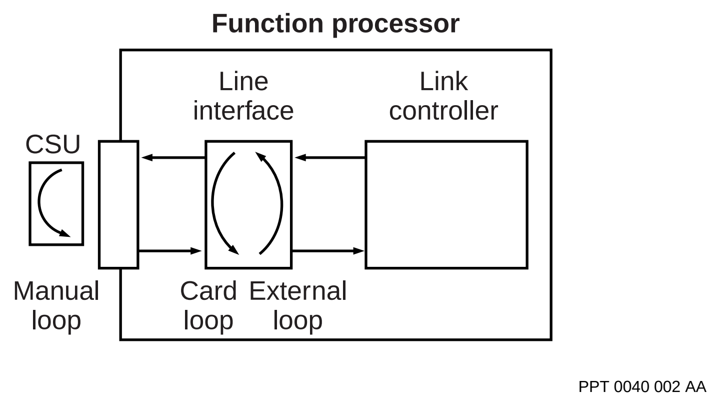
To run diagnostic tests on an E1 MVP-E FP, the *frmSize* attribute cannot exceed 1024. The E1 MVP-E loop tests cannot run on a channel associated with timeslot 16 when the linetype is CAS.

- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the line interface circuitry.

  Note: Nortel Networks recommends against performing a channel test on the 4-port E1 MVP-E FP while in service. Performing the channel test on this FP results in a loss of frame (LOF) alarm appearing on the port to which the tested channel belongs. The LOF condition is a red alarm that causes all the channels on the port to fail momentarily. The channels and voice services recover after the LOF is cleared during the course of the test. Channel tests on timeslot 16 are not supported on the 4-port E1 MVP-E FP.

The figure “Data paths for E1 MVP-E FP port tests and loopbacks” (page 139) shows the data path for each test and loopback.

Figure 27
Data paths for E1 MVP-E FP port tests and loopbacks



32-port E1 TDM FP tests additional considerations

The 32-port E1 TDM FP supports the *Test* component beneath the *E1* component, but does not support the *Test* component beneath the *Channel* component.

Each connector on the faceplate of a 32-port E1 TDM FP is used in conjunction with a multiport aggregate device.

If a connector on the faceplate of the FP, its associated multiport aggregate device, or the cable that connects the two fails, Passport generates alarms on the 16 E1 ports affected. The system does not distinguish between LOS and

LOF. If you use a termination panel to spare the FP and a termination panel connector or its associated cabling fails, Passport also generates alarms on the 16 E1 ports affected.

To determine the location of the fault, you can set up a manual loopback on the ports of the FP. If the problem clears, the fault is either with the termination panel or the multiport aggregate device. You can then set up a manual loopback on the termination panel to further isolate the problem. If the problem clears, the fault is with the multiport aggregate device.

To determine the location of faults for a single E1 port, you can set up a manual loopback on the multi-port aggregate device. If the problem clears, the problem is either with the cabling or with the far end.

Passport 7400 DS3 FP tests

Table 19
Passport 7400 DS3 FP tests

Card type	Port	Type of loopback test						Additional Considerations
		Card	manual	remoteLoop	externalLoop	payloadLoop	remoteLoopThisTrib	
DS3	DS3	X	X	X	X	X		“DS3 FP tests additional considerations” (page 141)
DS3C	DS3	X	X	X	X			“DS3C FP tests additional considerations” (page 142)
	DS1	X	X	X	X		X	
	Chan	X	X		X			
DS3 ATM	DS3	X	X	X	X	X		“DS3 ATM FP tests additional considerations” (page 143)
DS3 ATM IP	DS3	X	X	X	X	X		“DS3 ATM IP tests additional considerations” (page 145)
(Sheet 1 of 2)								

Table 19 (continued)
Passport 7400 DS3 FP tests

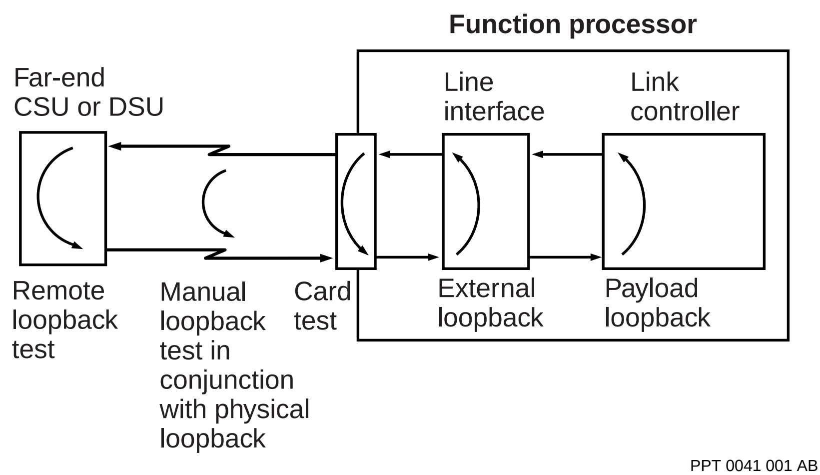
Card type	Port	Type of loopback test						Additional Considerations
		Card	manual	remoteLoop	externalLoop	payloadLoop	remoteLoopThisTrib	
DS3C TDM	DS3				X	X		"DS3C TDM FP tests additional considerations" (page 146)
	DS1							
(Sheet 2 of 2)								

DS3 FP tests additional considerations

- "Manual tests" (page 105):
  - — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 153 m (450 ft).
- "Manual tests using an external loopback" (page 106):
  - — The external loopback is established at the line interface circuitry.
- "Remote loopback tests" (page 108):
  - — On the DS3 port, a line loopback activate signal (carried over C-bits) is sent over the link to force the remote DS3 port to loop the signal. The loopback is held until the line loopback deactivate signal is sent out of the link.
  - — The DS3 remote loop test is supported only when using DS3 C-bit parity framing mode (the DS3 *CbitParity* attribute is set to *on*). With the attribute setting, the *DS3* component also responds to a remote test request.

The figure“Data paths for DS3 FP port tests and loopbacks” (page 142) shows the data path for each test and loopbacks.

Figure 28
Data paths for DS3 FP port tests and loopbacks

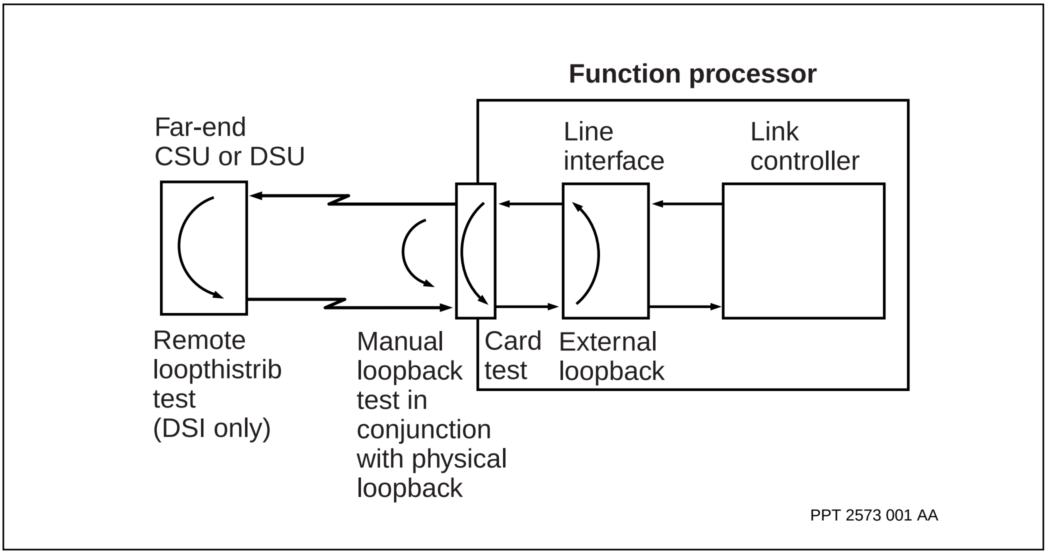


DS3C FP tests additional considerations

- “Card loopback test” (page 105):
  - — This test is supported with the bandwidth equivalent of a DS1.
- “Manual tests” (page 105):
  - — These test are supported with the bandwidth equivalent of a DS1.
- “Manual tests using an external loopback” (page 106):
  - — These tests are established by the user selecting this test or automatically by the *DS3* component responding to a FEAC DS3 LLB request if the *DS3*component’s *CbitParity* attribute is set to on. The entire DS3 bit stream is looped back.
- “Remote loopback tests” (page 108):
  - — These tests are supported only if the *DS3* component’s *CbitParity* attribute is set to on and the bandwidth equivalent of one DS1component is used.

The figure “Data paths for DS3C FP port tests and loopbacks” (page 143) shows the data path for each test and loopback.

Figure 29
Data paths for DS3C FP port tests and loopbacks



DS3 DS1 port tests on the DS3C FP

- “Manual tests using an external loopback” (page 106):
  - — These test are established by the *DS3* component in response to a FEAC DS3 LLB request when the *DS3* component’s *CbitParity* attribute is set to on.
- “Remote loopthistrib test” (page 109):
  - — This test is supported only when the *DS3* component’s *CbitParity* attribute is set to on.

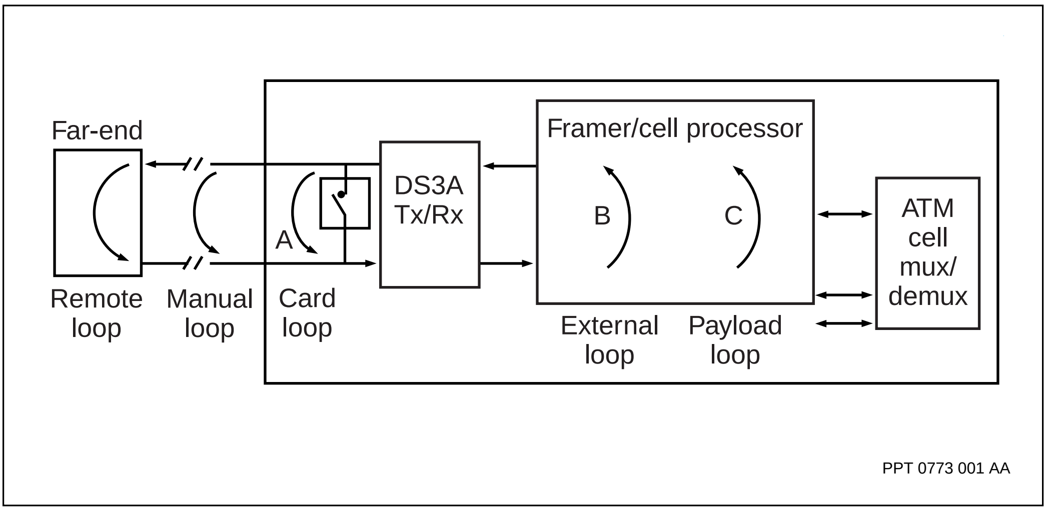
DS3 ATM FP tests additional considerations

- “Manual tests” (page 105):
  - — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 137m (450 ft).

- “Manual tests using an external loopback” (page 106):
  - — The external loopback is established at the line interface circuitry.
- “Manual tests using a payload loopback” (page 108):
  - — During the test, the DS3 frames (physical level) stops and the payload data loops over the link controller device.
- “Remote loopback tests” (page 108):
  - — On the DS3 port, a line loopback activate signal (carried over C-bits) travels over the link to force the remote DS3 port to loop the signal. The loopback stays there until the line loopback deactivate signal is sent out of the link.
  - — The DS3 remote loop test is supported only when using DS3 C-bit parity framing mode (the DS3 *CbitParity* attribute is set to on). With the attribute setting, the *DS3* component also responds to a remote test request.

The figure“Data paths for DS3 ATM port tests and loopbacks” (page 144) shows the data paths for each port test and loopback.

Figure 30
Data paths for DS3 ATM port tests and loopbacks

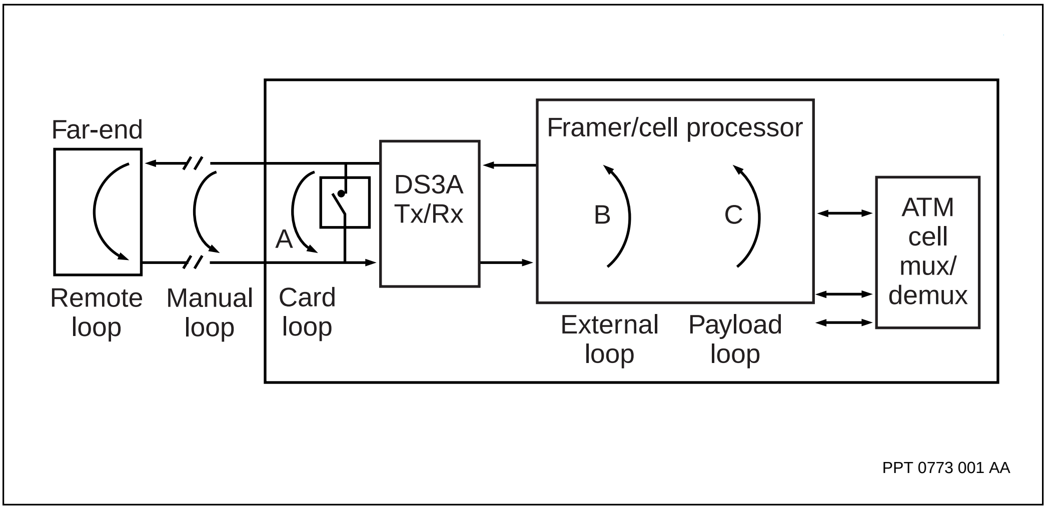


DS3 ATM IP tests additional considerations

- “Manual tests” (page 105):
  - Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 274 m (900 ft).
- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the line interface circuitry.
- “Manual tests using a payload loopback” (page 108):
  - During the test, the DS3 frames (physical level) stops and the payload data loops over the link controller device.
- “Remote loopback tests” (page 108):
  - On the DS3 port, a line loopback activate signal (carried over C-bits) travels over the link to force the remote DS3 port to loop the signal. The loopback stays there until the line loopback deactivate signal is sent out of the link.
  - The DS3 remote loop test is supported only when using DS3 C-bit parity framing mode (the DS3 *CbitParity* attribute is set to on). With the attribute setting, the *DS3* component also responds to a remote test request.

The figure “Data paths for DS3 ATM IP port tests and loopbacks” (page 146) shows the data paths for each port test and loopback.

Figure 31
Data paths for DS3 ATM IP port tests and loopbacks



DS3C TDM FP tests additional considerations

- “Manual tests using a payload loopback” (page 108):
  - — The DS3C TDM processor card only supports the payload loopback on the *DS1* components under the DS3 port. Therefore, the DS3 port does not support the payload loopback. Set the DS3 *CbitParity* attribute to on to enable the *DS3* component to support a remote loop or remote tributary loop test request from the far end. The *lineType* attribute beneath the *DS1* component must be set to *esf* in order to support a remote loopback request. The test will not run if the *lineType* attribute is set to *esfCas* or *d4Cas* and no test component will be visible.

Passport 7400 E3 FP tests

Table 20
Passport 7400 E3 FP tests

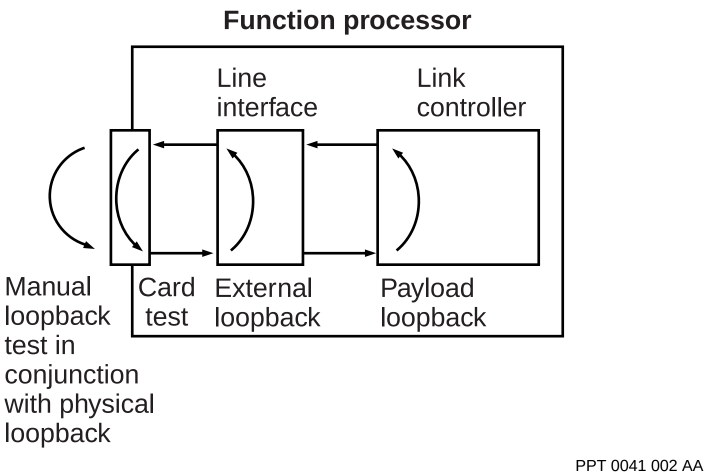
Card type	Port	Type of loopback test					Additional Considerations
		Card	manual	remoteLoop	externalLoop	payloadLoop	
1-port E3	E3	X	X		X	X	"E3 FP tests additional considerations" (page 147)
3-port E3 ATM	E3	X	X	X	X	X	"E3 ATM FP tests additional considerations" (page 148)
3-port E3 ATM IP	E3	X	X		X	X	"E3 ATM IP tests additional considerations" (page 149)

E3 FP tests additional considerations

- "Manual tests" (page 105):
  - — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for E3 cannot exceed 300 m (880 ft).
- "Manual tests using an external loopback" (page 106):
  - — The external loopback is established at the line interface circuitry.

The figure “Data paths for E3 FP port tests and loopbacks” (page 148) shows the data path for each test and loopback.

Figure 32
Data paths for E3 FP port tests and loopbacks

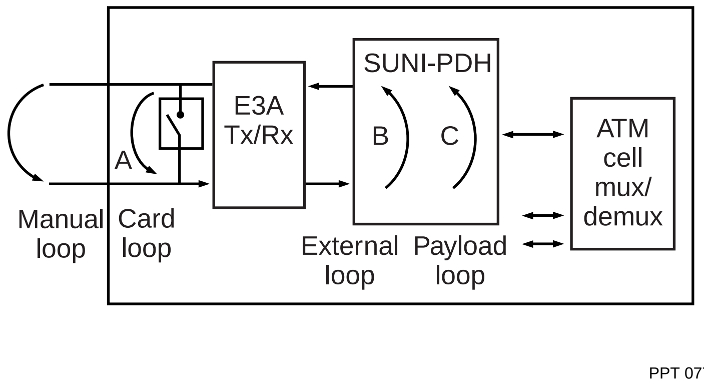


E3 ATM FP tests additional considerations

- “Manual tests” (page 105):
  - Make sure the loop lengths are within the required range and the lineLength provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for E3 cannot exceed 300 m (880 ft).
- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the line interface circuitry.

The figure “Data paths for E3 ATM FP port tests and loopbacks” (page 149) shows the data paths for each port test and loopback.

Figure 33
Data paths for E3 ATM FP port tests and loopbacks

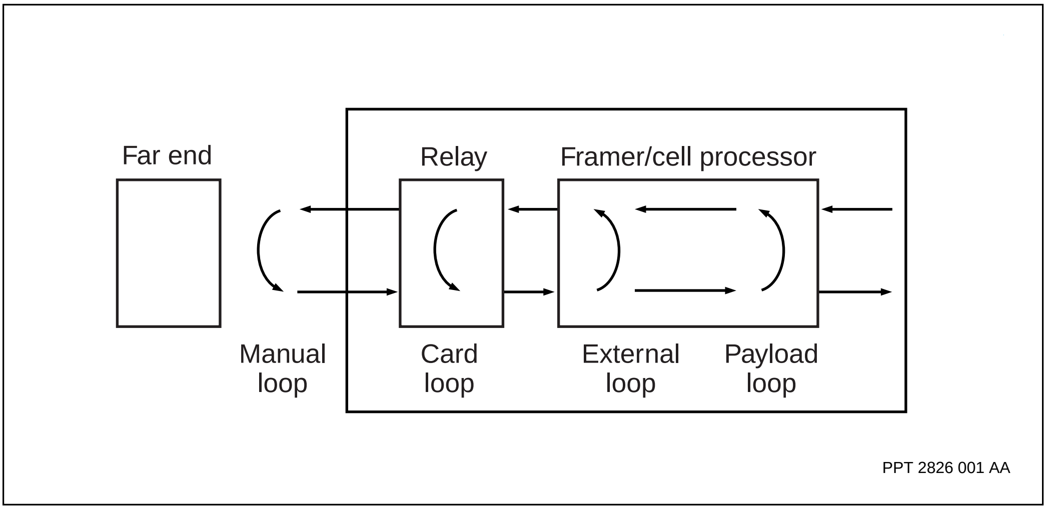


E3 ATM IP tests additional considerations

- “Manual tests” (page 105):
  - — Make sure the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for E3 cannot exceed 300 m (880 ft).
- “Manual tests using an external loopback” (page 106):
  - — The external loopback is established at the line interface circuitry.

The figure “Data paths for E3 ATM IP port tests and loopbacks” (page 150) shows the data paths for each port test and loopback.

Figure 34
Data paths for E3 ATM IP port tests and loopbacks



Passport 7400 OC3 FP tests

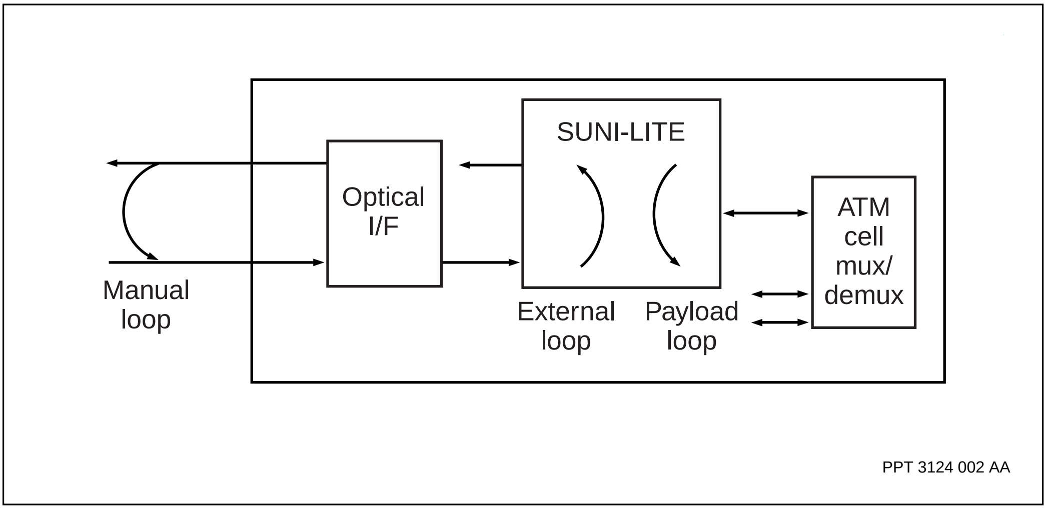
Table 21
Passport 7400 OC3 FP tests

Card type	Port	Type of loopback test			Additional Considerations
		Card	**manual**	**externalLoop**	
3-port OC-3 ATM	Sonet/SDH	X		X	"OC-3 ATM FP tests additional considerations" (page 151)
	Path				
2-port OC-3 ATM IP	Sonet/SDH	X	X	X	"OC-3 ATM IP tests additional considerations" (page 152)
	Path				

OC-3 ATM FP tests additional considerations

The figure“Data paths for OC-3 ATM FP port tests and loopbacks” (page 151) displays the data path for each test and loopback.

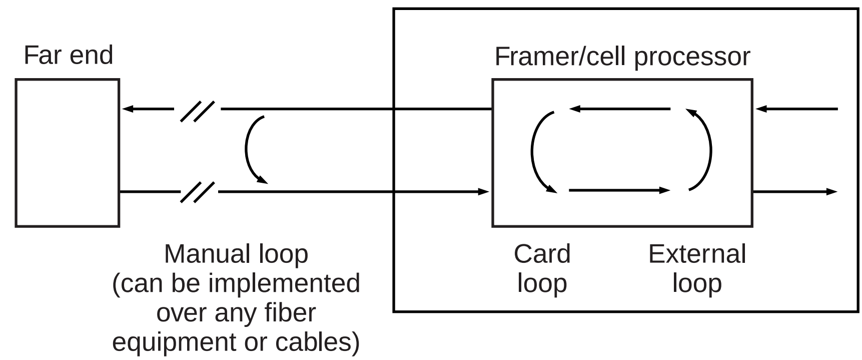
Figure 35
Data paths for OC-3 ATM FP port tests and loopbacks



OC-3 ATM IP tests additional considerations

The figure “Data paths for OC-3 ATM IP port tests and loopbacks” (page 152) displays the data path for each test and loopback.

Figure 36
Data paths for OC-3 ATM IP port tests and loopbacks



Passport 7400 2-port STM-1 electrical ATM FP tests

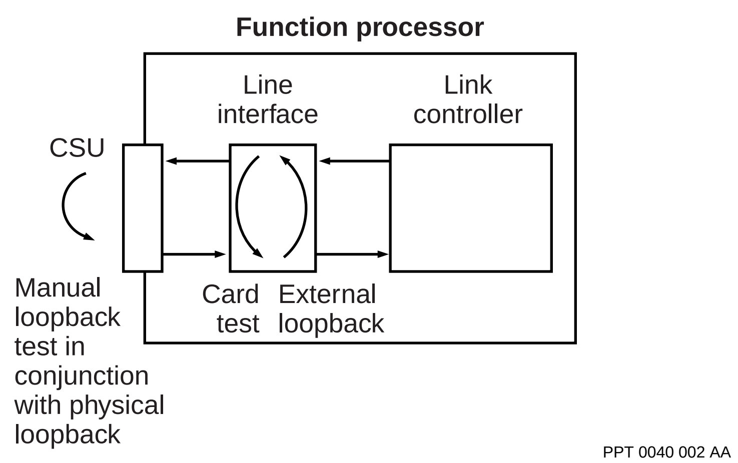
Table 22
Passport 7400 STM-1 FP tests

Card type	Port	Type of loopback test			Additional Considerations
		Card	manual	externalLoop	
2-port STM-1 electrical ATM	SDH	X	X	X	“2-port STM-1 electrical ATM FP tests additional considerations” (page 153)

2-port STM-1 electrical ATM FP tests additional considerations

The figure “Data paths for 2-port STM-1 electrical ATM FP port tests and loopbacks” (page 153) displays the data path for each test and loopback.

Figure 37
Data paths for 2-port STM-1 electrical ATM FP port tests and loopbacks



Passport 7400 2-port STM-1 electrical channelized CES/ATM/IMA FP tests

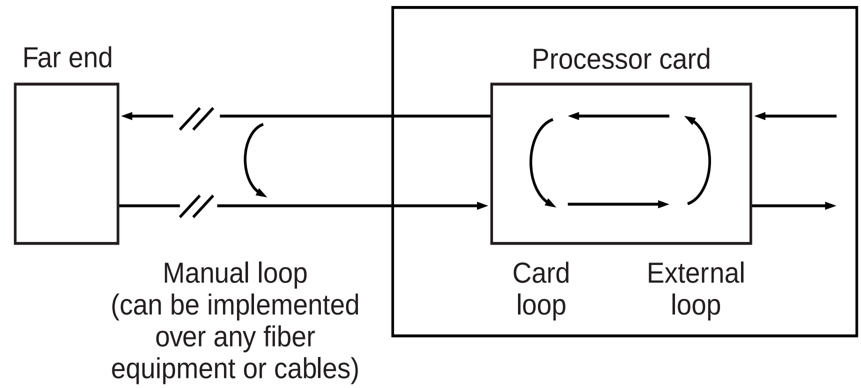
Table 23
Passport 7400 STM-1e channelized CES/ATM/IMA FP tests

Card type	Port	Type of loopback test				Additional Considerations
		Card	manual Loop	externalLoop	payloadLoop	
2-port STM-1 electrical channelized CES/ATM/IMA	SDH	X	X	X	X	Bit Interleaved Parity (BIP-8) is also supported on this port.
2-port STM-1 electrical channelized CES/ATM/IMA	E1	X	X	X		

2-port STM-1 electrical channelized CES/ATM/IMA FP tests additional considerations

The figure “Data paths for 2-port STM-1 channelized CES/ATM/IMA FP port tests and loopbacks” (page 155) displays the data path for each test and loopback.

Figure 38
Data paths for 2-port STM-1 channelized CES/ATM/IMA FP port tests and loopbacks



Other Passport 7400 FP tests

Table 24
Other Passport 7400 FP tests

Card type	Port	Type of loopback test						Additional Considerations
		Card	manual	localLoop	remoteLoop	externalLoop	payloadLoop	
V.11	X21	X	X	X	X	X		“V.11 FP tests additional considerations” (page 156)
V.35	V35	X	X			X		“V.35 FP tests additional considerations” (page 158)
HSSI	HSSI	X	X	X		X		“HSSI FP tests additional considerations” (page 159)
(Sheet 1 of 2)								

Table 24 (continued)
Other Passport 7400 FP tests

Card type	Port	Type of loopback test						Additional Considerations
		Card	manual	localLoop	remoteLoop	externalLoop	payloadLoop	
JT2 ATM	JT2	X	X			X	X	“JT2 ATM FP tests additional considerations” (page 161)
TTC2M	E1	X	X			X	X	“TTC2M MVP-E FP tests additional considerations” (page 161)
(Sheet 2 of 2)								

V.11 FP tests additional considerations

- “Local loopback test” (page 105):
  - To run local tests on ports associated with an X21 component, you must configure the component as DTE. The X21 component does not respond to a local test request from the far end.
- “Manual tests” (page 105):
  - The test depends on whether the port is configured for DTE mode or for DCE mode.
  - Ports configured as DTE do not support physical loopbacks inserted at the termination panel. You can only run a manual test where either test equipment or another Passport provides a loopback point. The equipment that provides the loopback must also provide the clock source.
  - If the *dteDataClockSource* attribute for the port is set to *fromDce*, you do not need to physically loop the clock.
  - If you need to insert a clock loopback at the termination panel, enter provisioning mode and change the value for the *dteDataClockSource* to *fromDte*. When the test is completed, change the clock source back to *fromDce*.

— If you want to insert a physical loopback, you must cross-connect the transmit pins to the receive pins. For port configured as DCE, you can only insert the loopback at the termination panel.

- “Manual tests using a physical loopback” (page 106):

— If the *dteDataClockSource* for the port is set to *fromDte*, you can physically loop the clock. Alternately, you can use external test equipment or another Passport node that has an external loopback set up at the loopback point.

- “Manual tests using an external loopback” (page 106):

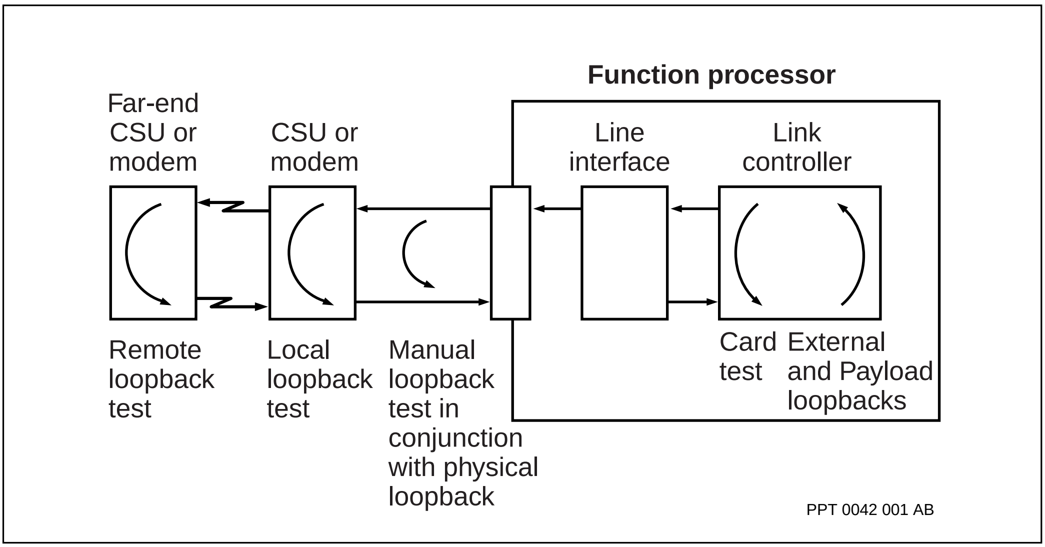
— The external loopback is established at the link controller.

- “Remote loopback tests” (page 108):

— This test is only supported on the X.21 component.

The figure “Data paths for V.11 FP port tests and loopbacks” (page 157) shows the data path for each test and loopback.

Figure 39
Data paths for V.11 FP port tests and loopbacks

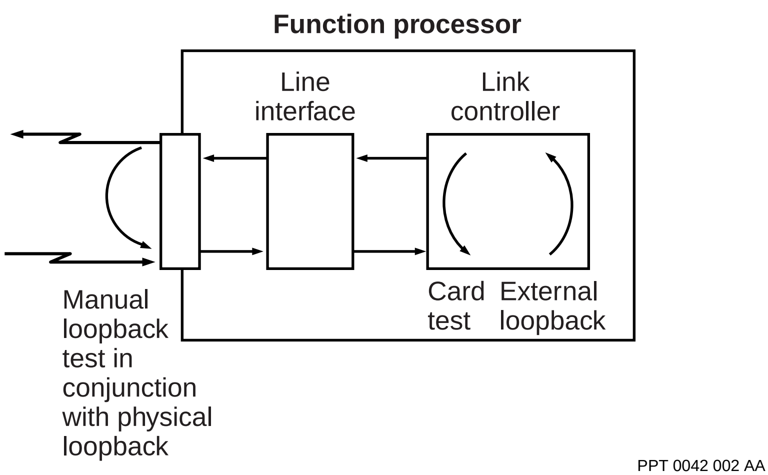


V.35 FP tests additional considerations

- “Manual tests” (page 105):
  - The test depends on whether the port is configured for DTE mode or for DCE mode.
  - Ports configured as DTE do not support physical loopbacks inserted at the termination panel. You can only run a manual test where either test equipment or another Passport provides a loopback point. The equipment that provides the loopback must also provide the clock source.
  - If the *dteDataClockSource* attribute for the port is set to *fromDce*, you do not need to physically loop the clock.
  - If you need to insert a clock loopback at the termination panel, enter provisioning mode and change the value for the *dteDataClockSource* to *fromDte*. When the test is completed, change the clock source back to *fromDce*.
  - If you want to insert a physical loopback, you must cross-connect the transmit pins to the receive pins. For port configured as DCE, you can only insert the loopback at the termination panel.
- “Manual tests using a physical loopback” (page 106):
  - If the *dteDataClockSource* for the port is set to *fromDte,* you can physically loop the clock. Alternately, you can use external test equipment or another Passport node that has an external loopback set up at the loopback point.
- “Manual tests using an external loopback” (page 106):
  - The external loopback is established at the link controller.

The figure "Data paths for V.35 port tests and loopbacks" (page 159) shows the data path for each test and loopback.

Figure 40
Data paths for V.35 port tests and loopbacks

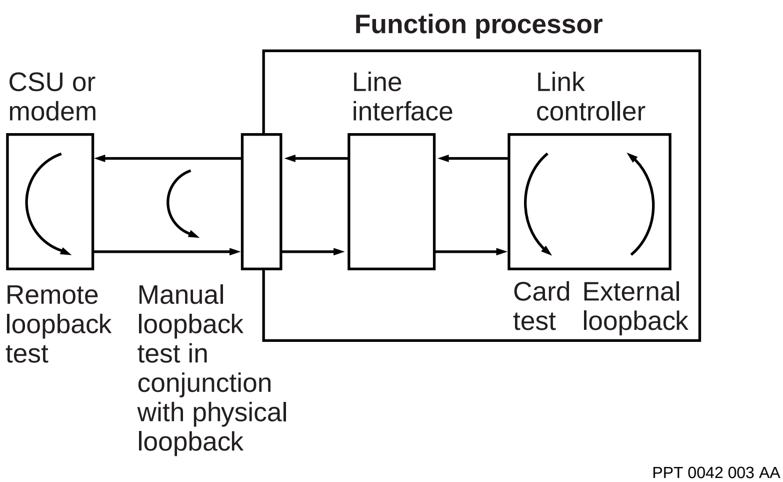


HSSI FP tests additional considerations

- "Local loopback test" (page 105):
  - — This test is also called the HSSI LA loopback-type or the HSSI Local Digital Loopback (loop A). See "HSSI local loopback test" (page 160)
- "Manual tests" (page 105):
  - — For a manual test on *HSSI* components, a physical loopback through hardware manipulation is not possible. If you start a manual test, you must set up an external loopback on the far-end node.
- "Manual tests using an external loopback" (page 106):
  - — The external loopback is established at the link controller.

The figure “Data paths for HSSI FP port tests and loopbacks” (page 160) shows the data paths for each test and loopback.

Figure 41
Data paths for HSSI FP port tests and loopbacks



HSSI local loopback test

You can use the HSSI local loopback test (also called HSSI local digital loopback or loop A) to test the link between a DTE and a DCE. Start the test on the DTE side of the connection. The system handles the loopback set up and test in this way:

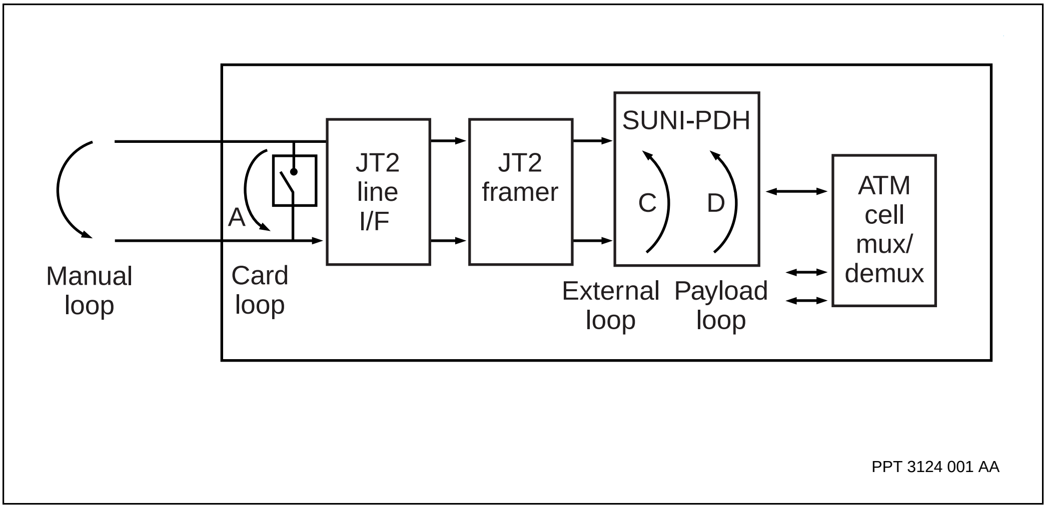
- On the DTE side, the HSSI local loop test asserts the LA and LB loopback control leads. The test then sends out a test pattern to the other end DCE for a preset time after a dataStartDelay period. The HSSI DTE must be unlocked.
- On the DCE side, the FP detects the ON state of the LA and LB loopback control leads. The FP issues an alarm to warn the operator that it has received the loopback request and suspended the service on the port while the test is in progress. The OSI state at the DCE changes to reflect this condition.
- The DCE implements the loopback at the link controller and the entire port is looped back. The DCE then asserts the TM signal toward the DTE.

- When the test is completed, the DTE turns off the LA and LB loopback control leads.
- On the DCE side, the FP detects the OFF state of the LA and LB loopback control leads and takes down the loopback.
- The DCE clears the alarm to let the operator know that service will resume at this port, and sets the OSI state back to the previous state. The DCE then turns off the TM signal.

JT2 ATM FP tests additional considerations

The figure “Data paths for JT2 ATM FP port tests and loopbacks” (page 161) shows the data paths for each test and loopback.

Figure 42
Data paths for JT2 ATM FP port tests and loopbacks

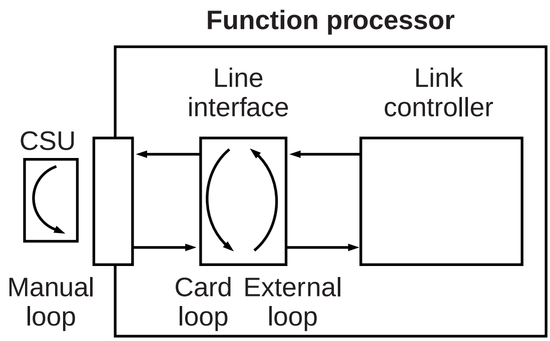


TTC2M MVP-E FP tests additional considerations

In order to run diagnostic tests on an E1 MVP-E FP, the *frmSize* attribute cannot exceed 1024. You cannot run a loop test on a channel associated with timeslot 16 if the *linetype* attribute is set to CAS.

The figure “Data paths for TTC2M MVP-E FP tests and loopbacks” (page 162) shows the data path for each test and loopback.

Figure 43
Data paths for TTC2M MVP-E FP tests and loopbacks



PPT 0040 002 AA

Tests for Passport 15000 or 20000 function processors

This section describes the specific diagnostic tests which can be performed for each family of function processor (FP) cards available with Passport 15000 or 20000.

- “Passport 15000 or 20000 E1 FP tests” (page 163)
- “Passport 15000 or 20000 DS3 FP tests” (page 164)
- “Passport 15000 or 20000 E3 FP tests” (page 172)
- “Passport 15000 or 20000 OC-3/STM-1 FP tests” (page 174)
- “Passport 15000 or 20000 OC-12/STM-4 FP tests” (page 179)
- “Passport 15000 or 20000 OC-48/STM-16 FP tests” (page 181)
- “Passport 15000 or 20000 STM-1 FP tests” (page 183)
- “Other Passport 15000 or 20000 FPs” (page 185)

Passport 15000 or 20000 E1 FP tests

Table 25
Passport 15000 or 20000 E1 FP tests

Card type	Port	Type of loopback test				Additional considerations
		Card	manual	externalLoop	payloadLoop	
32-port E1 TDM	E1	X	X	X	X	“32-port E1 TDM FP tests additional considerations” (page 163)

32-port E1 TDM FP tests additional considerations

The 32-port E1 TDM FP supports the *Test* component beneath the *E1* component, but does not support the *Test* component beneath the *Channel* component.

Each connector on the faceplate of a 32-port E1 TDM FP is used in conjunction with a multiport aggregate device.

If a connector on the faceplate of the FP, its associated multiport aggregate device, or the cable that connects the two fails, Passport generates alarms on the 16 E1 ports affected. The system does not distinguish between LOS and LOF. If you use a termination panel to spare the FP and a termination panel connector or its associated cabling fails, Passport also generates alarms on the 16 E1 ports affected.

To determine the location of the fault, you can set up a manual loopback on the ports of the FP. If the problem clears, the fault is either with the termination panel or the multiport aggregate device. You can then set up a manual loopback on the termination panel to further isolate the problem. If the problem clears, the fault is with the multiport aggregate device.

To determine the location of faults for a single E1 port, you can set up a manual loopback on the multi-port aggregate device. If the problem clears, the problem is either with the cabling or with the far end.

Passport 15000 or 20000 DS3 FP tests

Table 26
Passport 15000 or 20000 DS3 FP tests

Card type	Port	Type of loopback test						Additional considerations
		Card	manual	remoteLoop	externalLoop	payloadLoop	v54RemoteLoop	
4-port DS3 channelized frame relay	DS3	X	X	X	X			“4-port DS3 channelized frame relay FP tests additional considerations” (page 165)
	DS1	X	X	X	X			
	Chan	X	X		X		X	
(Sheet 1 of 2)								

Table 26 (continued)
Passport 15000 or 20000 DS3 FP tests

Card type	Port	Type of loopback test						Additional considerations
		Card	**manual**	**remoteLoop**	**externalLoop**	**payloadLoop**	**v54RemoteLoop**	
4-port DS3 channelized ATM	DS3	X	X	X	X			"4-port DS3 channelized ATM FP tests additional considerations" (page 167)
	DS1	X	X	X	X			
4-port DS3 channelized AAL1 CES	DS3				X	X		"4-port DS3 channelized AAL1 CES FP tests additional considerations" (page 168)
	DS1				X	X		
12-port DS3 ATM	DS3	X	X	X	X	X		"12-port DS3 ATM FP tests additional considerations" (page 170)
2-port DS3 C TDM	DS3				X			"2-port DS3C TDM FP tests additional considerations" (page 171)
	DS1	X	X	X	X	X		
(Sheet 2 of 2)								

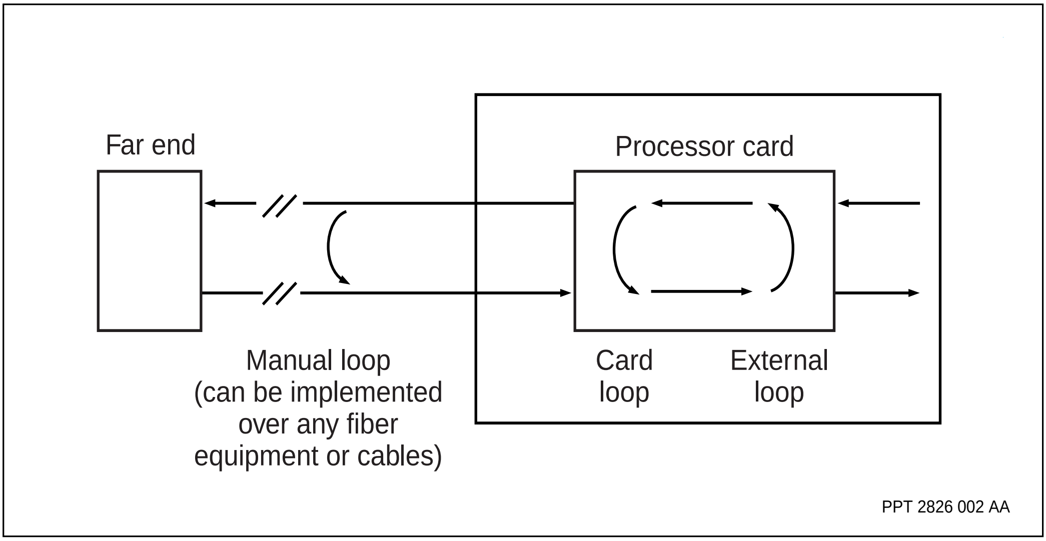
4-port DS3 channelized frame relay FP tests additional considerations

- "Remote loopback tests" (page 108):
  - — The remote loopback test is supported only when DS3 is in C-bit mode.
- "Manual tests using an external loopback" (page 106):
  - — Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 153 m (450 ft).
- "V.54 remote loopback test" (page 110)

— See “V.54 remote loopback testing on a channelized 4-port DS3 FP” (page 166) for additional information about the V.54 remote loopback test on the 4-port DS3 channelized frame relay FP.

The figure “Data paths for 4-port DS3 channelized frame relay FP port tests and loopbacks” (page 166) shows the data paths for each test and loopback.

Figure 44
Data paths for 4-port DS3 channelized frame relay FP port tests and loopbacks



V.54 remote loopback testing on a channelized 4-port DS3 FP

You can use the V.54 test to test a single channel down to the individual DS0 level, as well as to test multiple channels simultaneously. To test a channel on an 4pDs3Ch FP, the connections to the CSU/DSU must be up and running as shown in the figure “V.54 remote loopback test on a channelized 4-port DS3 FP” (page 167). In this configuration, a multiplexor must be present to convert the DS3 to a DS1, since the 4pDS3Ch FP is DS3-based, while the CSU/DSU ports are DS1-based.

The figure “V.54 remote loopback test on a channelized 4-port DS3 FP to a DDS network” (page 167) shows the V.54 remote loopback test from a 4-port DS3 FP to a DDS network.

Figure 45
V.54 remote loopback test on a channelized 4-port DS3 FP

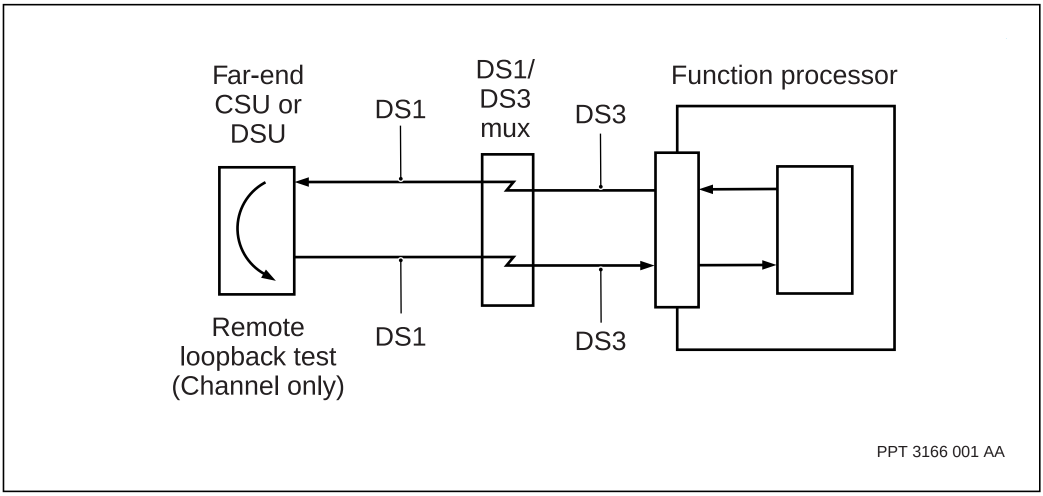
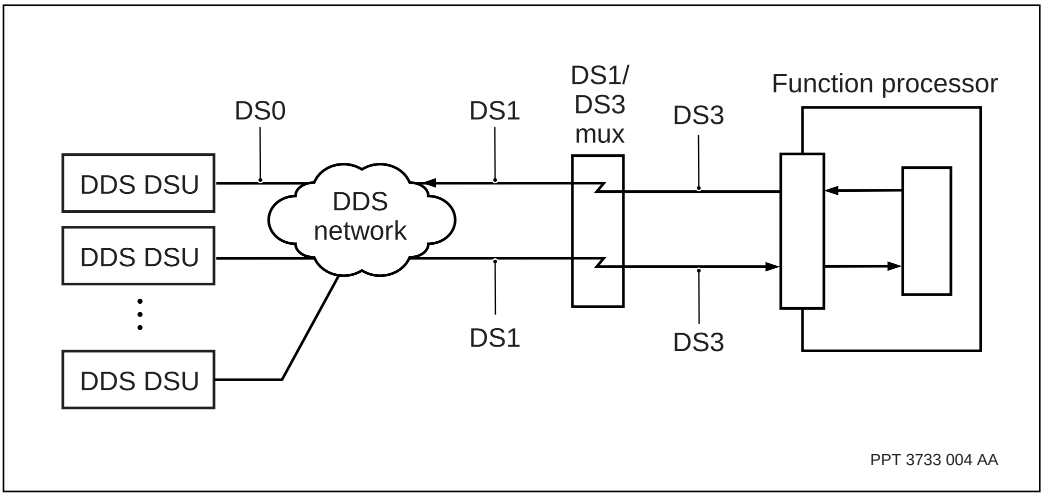


Figure 46
V.54 remote loopback test on a channelized 4-port DS3 FP to a DDS network



4-port DS3 channelized ATM FP tests additional considerations

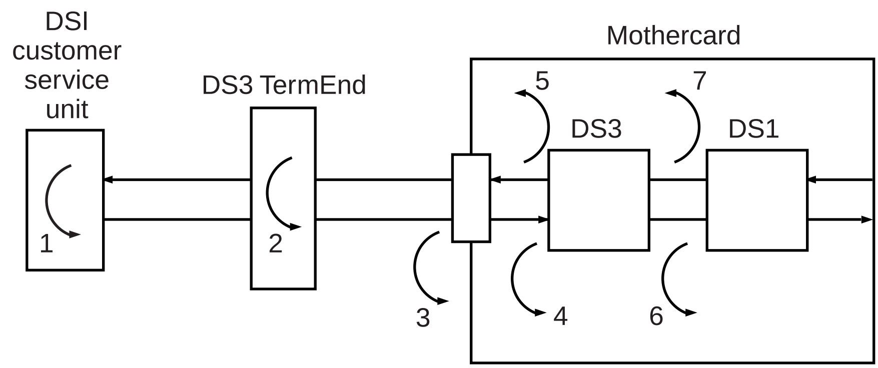
- “Remote loopback tests” (page 108):

— The remote loopback test is only when DS3 is in C-bit mode.

For information on provisioning IMA, see 241-5701-730 *Passport 7400, 15000, 20000 Inverse Multiplexing for ATM Guide*.

The figure “Data paths for 4-port DS3 channelized ATM port tests and loopbacks” (page 168) shows the data paths for each port test and loopback.

Figure 47
Data paths for 4-port DS3 channelized ATM port tests and loopbacks



Pt.1 = Lp DS3 DS1 test type Remote Loop
Pt.2 = Lp DS3 test type Remote loop (only when DS3 is in C-bit mode)
Pt.3 = Lp DS3 test type Physical loop
Pt.3 = Lp DS3 DS1 test type Manual
Pt.4 = Lp DS3 test type Card
Pt.5 = Lp DS3 test type External loop
Pt.6 = Lp DS3 DS1 test type Card
Pt.7 = Lp DS3 DS1 test type External loop

PPT 2276 001 AA

4-port DS3 channelized AAL1 CES FP tests additional considerations

- “Manual tests using an external loopback” (page 106):
  - — For the *DS3* component, the whole DS3 stream is looped back (ingress to egress), AIS is transmitted downstream, and the DS3 data stream is not framed.

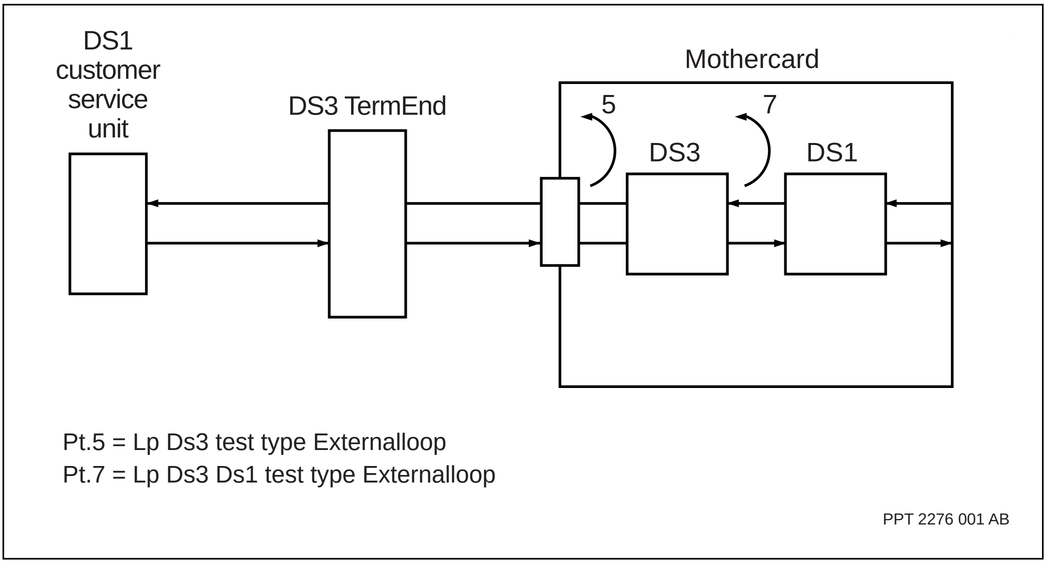
  - — For the *DS1* component, the whole DS1 stream is looped back (ingress to egress), and if the DS1 line type is defined to be framed (value d4 or esf), the DS1 data stream is framed. If framing does not occur, unframed data is sent.

- "Manual tests using a payload loopback" (page 108):
  - — For the *DS3* component, only the DS3 payload portion of the stream is looped back (ingress to egress), AIS is transmitted downstream on all defined DS1 streams, and an attempt to frame the DS3 data stream occurs.
  - — For the *DS1* component, only the DS1 payload portion of the stream is looped back (ingress to egress), and if the DS1 line type is defined to be framed (value d4 or esf), the DS1 data stream is framed. If framing does not occur, unframed data is sent.

For more information on provisioning circuit emulation services (CES), see 241-5701-720 *Passport 7400, 15000, 20000 AAL1 Circuit Emulation Guide*.

The figure "Data paths for 4-port DS3 channelized AAL1 CES port tests and loopbacks" (page 170) shows the data paths for each port test and loopback.

Figure 48
Data paths for 4-port DS3 channelized AAL1 CES port tests and loopbacks

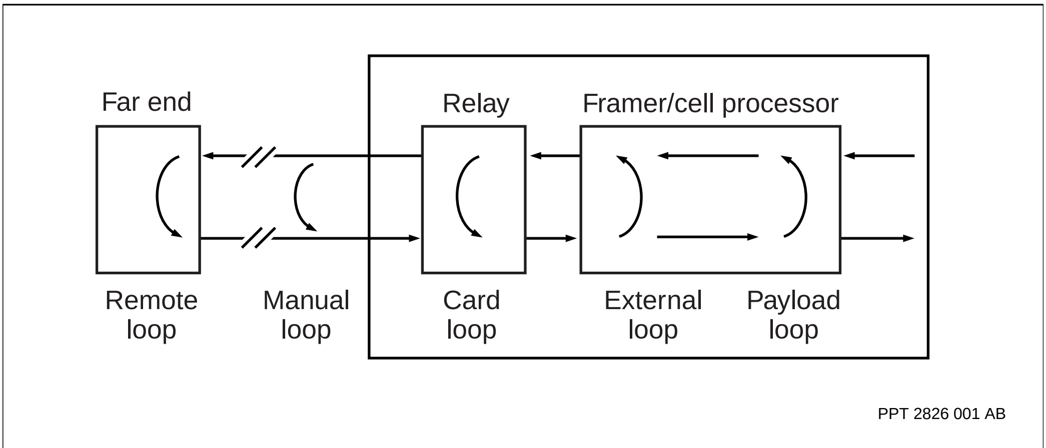


12-port DS3 ATM FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - — Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 153 m (450 ft).

The figure “Data paths for 12-port DS3 ATM port tests and loopbacks” (page 171) shows the data paths for each port test and loopback.

Figure 49
Data paths for 12-port DS3 ATM port tests and loopbacks



2-port DS3C TDM FP tests additional considerations

- "Manual tests using a payload loopback" (page 108):
  - The DS3C TDM processor card only supports the payload loopback on the *DS1* components under the DS3 port. Therefore, the DS3 port does not support the payload loopback. Set the DS3 *CbitParity* attribute to on to enable the *DS3* component to support a remote loop or remote tributary loop test request from the far end. The *lineType* attribute beneath the *DS1* component must be set to esf in order to support a remote loopback request.

Passport 15000 or 20000 E3 FP tests

Table 27
Passport 15000 or 20000 E3 FP tests

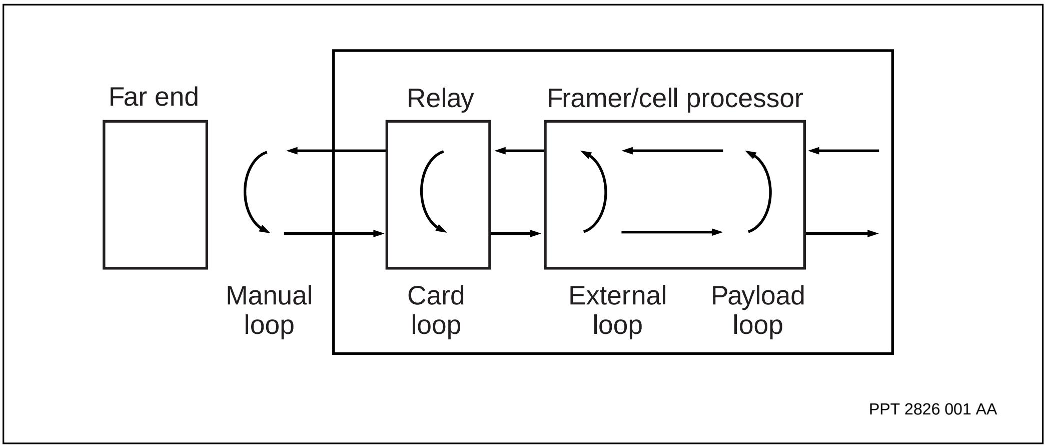
Card type	Port	Type of loopback test				Additional Considerations
		Card	manual	externalLoop	payloadLoop	
3-port E3 ATM	E3	X	X	X		
12-port E3 ATM	E3	X	X	X	X	“12-port E3 ATM FP tests additional considerations” (page 172)

12-port E3 ATM FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - — Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set. If the looped signal is not reamplified, the round-trip loop length for DS3 cannot exceed 300 m (880 ft).

The figure “Data paths for 12-port E3 ATM FP port tests and loopbacks” (page 173) shows the data paths for each port test and loopback.

Figure 50
Data paths for 12-port E3 ATM FP port tests and loopbacks



E3 G.832 trail trace

On E3 interfaces using G.832 framing, you can use the trail trace feature to verify the continued connection of the E3 port to the intended far-end port.

Many E3 equipment vendors do not support the trail trace feature of G.832 framing and send an obscure string in place of the trail trace string expected by Passport. If the received trail trace string differs from the provisioned *trailTraceTransmitted* string, Passport sets a trail trace mismatch alarm.

To determine if trail trace strings are causing G.832 trail trace mismatch alarms, use the following command to display a received string:

```
display lp/<n> e3/<p> g832 trailTraceReceived
```

where:
<n> is the instance number of the logical processor for the E3 FP.
<p> is the port number.

By reviewing the received string, you can determine whether the alarm was set because of an E3 misconnection or because Passport received an obscure string. If the far end is sending an obscure string, you can provision the G832 trailTraceExpected to match that value.

Passport 15000 or 20000 OC-3/STM-1 FP tests

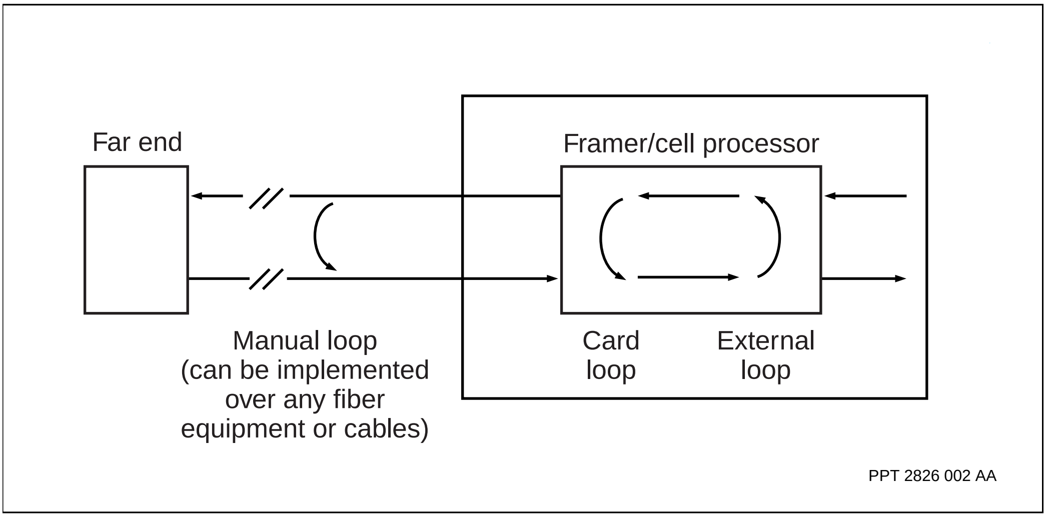
Table 28
Passport 15000 or 20000 OC-3/STM-1 FP tests

Card type	Port	Type of loopback test							Additional Considerations
		Card	manual	externalLoop	payloadLoop	lineBIP8Error	sectionBIP8Error	O.151 OAM loopback	
4-port OC-3c/STM-1 ATM	Sonet or SDH	X	X	X					"4-port OC-3c/STM-1 ATM FP tests additional considerations" (page 174)
4-port OC-3/STM-1 Ch TDM/CES	Sonet or SDH	X		X	X	X	X		"4-port OC-3/STM-1Ch TDM/CES FP tests additional considerations" (page 175)
	DS1 or E1	X	X	X	X				
16-port OC-3/STM-h1 ATM	Sonet or SDH	X	X	X					"16-port OC-3/STM-1 ATM FP tests additional considerations" (page 176)
16-port OC-3/STM-1 ATM with OAM cell conversion	Sonet or SDH	X	X	X				X	"16-port OC-3/STM-1 ATM FP tests additional considerations" (page 176)
VSP-o FP	Sonet or SDH	X		X	X	X	X		"Voice services processor 3 with optical TDM interface (VSP3-o) FP tests additional considerations" (page 177)
	DS1 or E1	X	X	X	X				
	VSP	X							

4-port OC-3c/STM-1 ATM FP tests additional considerations

The figure "Data paths for 4-port OC-3c/STM-1 ATM FP port tests and loopbacks" (page 175) displays the data path for each test and loopback.

Figure 51
Data paths for 4-port OC-3c/STM-1 ATM FP port tests and loopbacks

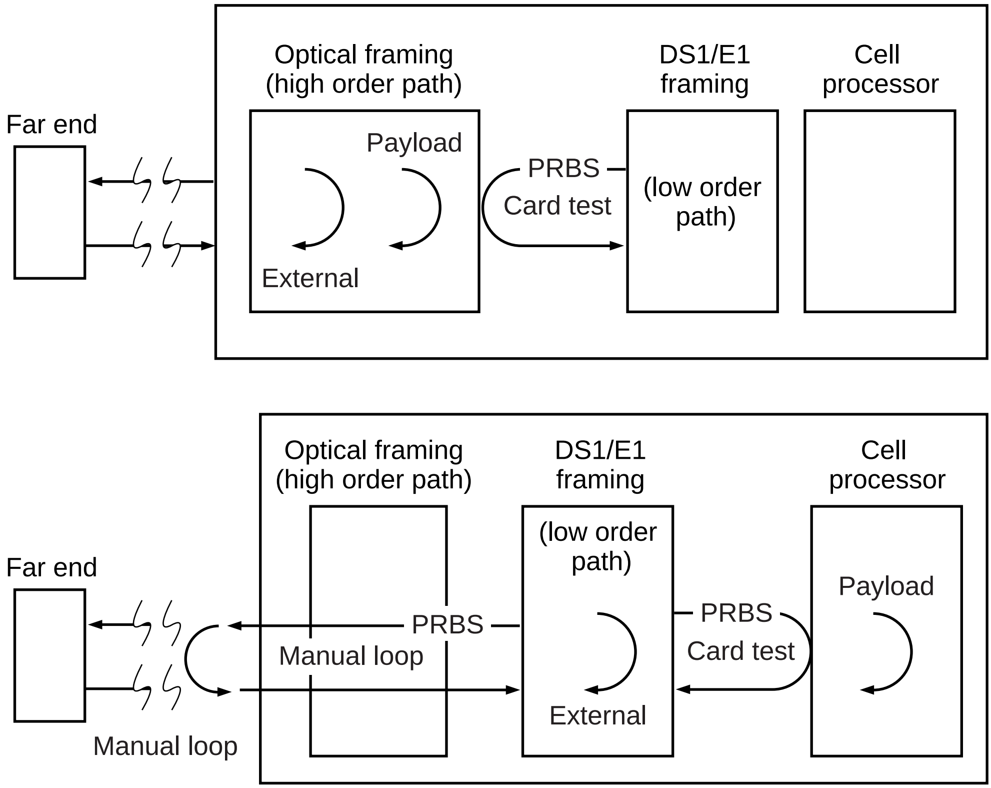


4-port OC-3/STM-1Ch TDM/CES FP tests additional considerations

- “Card loopback test” (page 105):
  - — The card loopback test is applicable to SDH/SONET and E1/DS1 test components while the manual test is applicable to the E1/DS1 test component only.

The figure “Data paths for 4-port OC-3/STM-1Ch TDM/CES FP port tests and loopbacks” (page 176) displays the data path for each test and loopback.

Figure 52
Data paths for 4-port OC-3/STM-1Ch TDM/CES FP port tests and loopbacks



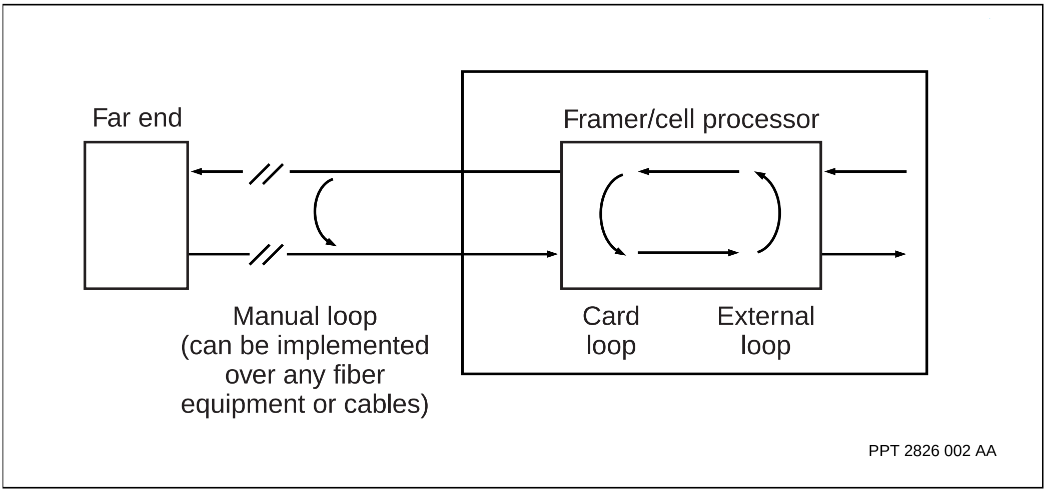
Note: Only configured tributaries are tested for a card test. For a full card test, tributaries must be configured.
Card tests use an internally generated pseudo random bit sequence (PRBS) pattern.

PPT 3145 001 AA

16-port OC-3/STM-1 ATM FP tests additional considerations

The figure “Data paths for 16-port OC-3/STM-1 ATM FP port tests and loopbacks” (page 177) displays the data path for each test and loopback.

Figure 53
Data paths for 16-port OC-3/STM-1 ATM FP port tests and loopbacks

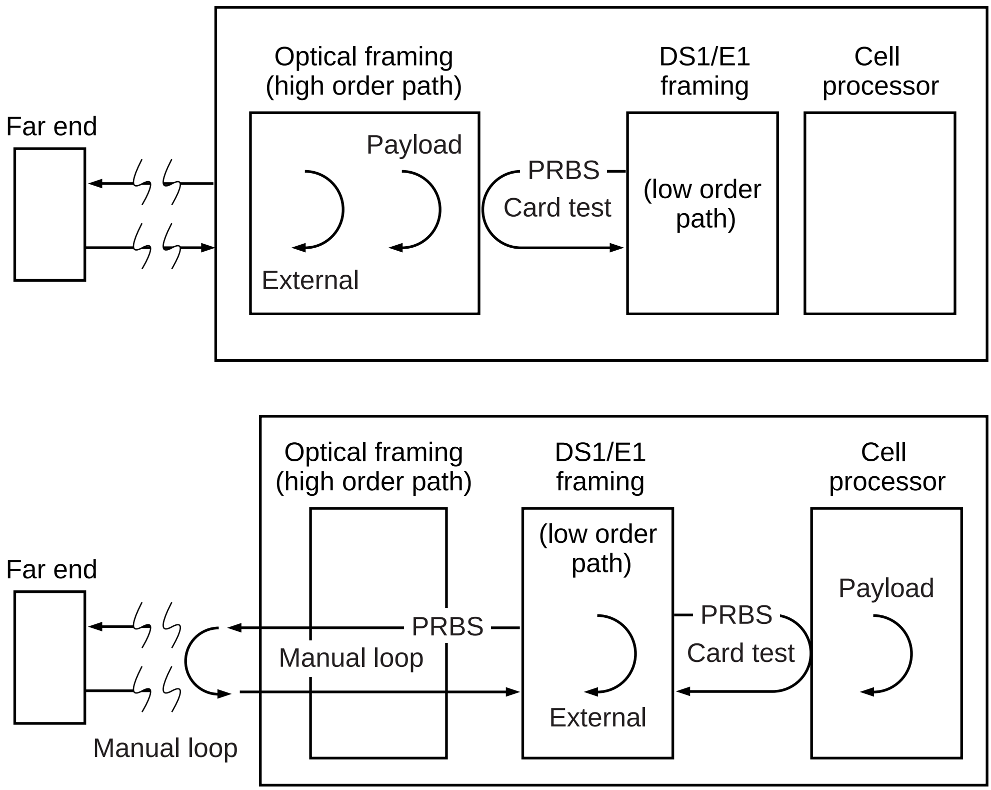


Voice services processor 3 with optical TDM interface (VSP3-o) FP tests additional considerations

- “Card loopback test” (page 105):
  - — The card loopback test is applicable to SDH/SONET and E1/DS1 test components while the manual test is applicable to the E1/DS1 test component only.

The figure “Data paths for VSP3-o FP port tests and loopbacks” (page 178) displays the data path for each test and loopback.

Figure 54
Data paths for VSP3-o FP port tests and loopbacks



Note: Only configured tributaries are tested for a card test. For a full card test, tributaries must be configured.
Card tests use an internally generated pseudo random bit sequence (PRBS) pattern.

PPT 3145 001 AA

Passport 15000 or 20000 OC-12/STM-4 FP tests

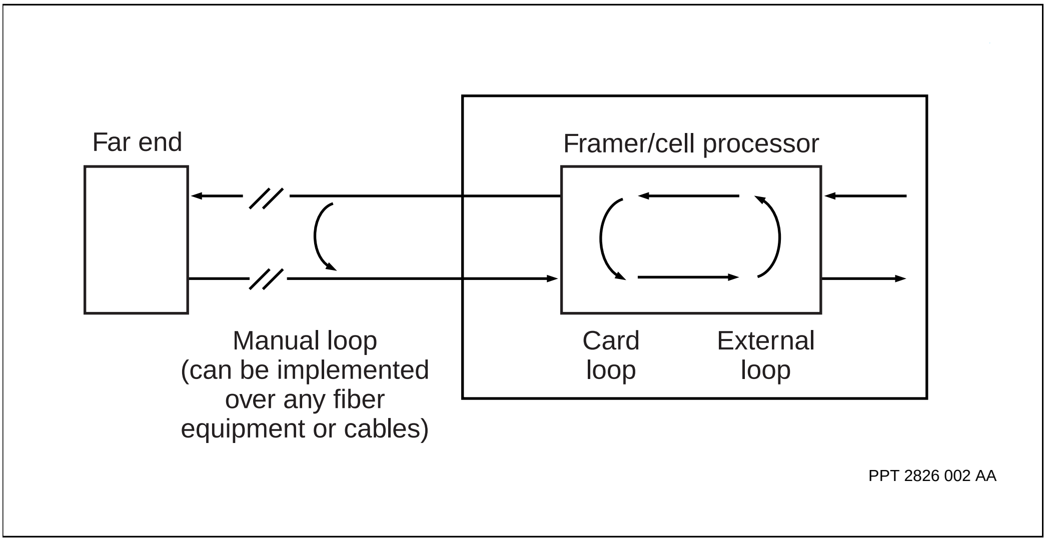
Table 29
Passport 15000 or 20000 OC-12/STM-4 FP tests

Card type	**Port**	**Type of loopback test**			**Additional Considerations**
		Card	**manual**	**externalLoop**	
1-port OC-12/STM-4 ATM	Sonet/SDH	X	X	X	
4-port OC-12/STM-4 channelized ATM	Sonet/SDH	X	X	X	“4-port OC-12/STM-4 channelized ATM FP tests additional considerations” (page 180)

1-port OC-12/STM-4 ATM FP tests additional considerations

The figure “Data paths for 1-port OC-12/STM-4 ATM FP port tests and loopbacks” (page 180) displays the data path for each test and loopback.

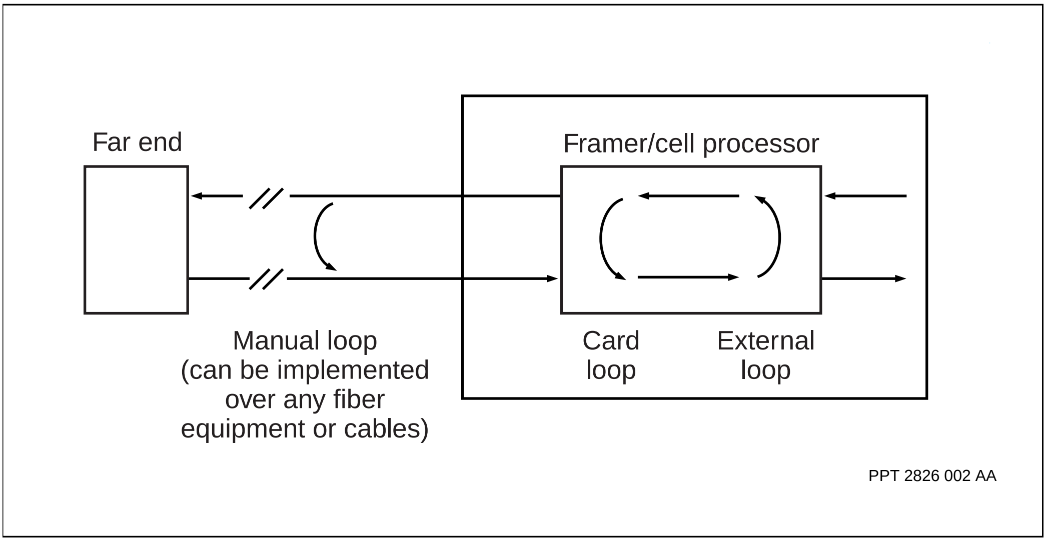
Figure 55
Data paths for 1-port OC-12/STM-4 ATM FP port tests and loopbacks



4-port OC-12/STM-4 channelized ATM FP tests additional considerations

The figure “Data paths for 4-port OC-12/STM-4 channelized ATM FP port tests and loopbacks” (page 181) displays the data path for each test and loopback.

Figure 56
Data paths for 4-port OC-12/STM-4 channelized ATM FP port tests and loopbacks



Passport 15000 or 20000 OC-48/STM-16 FP tests

Table 30
Passport 15000 or 20000 OC-48/STM-16 FP tests

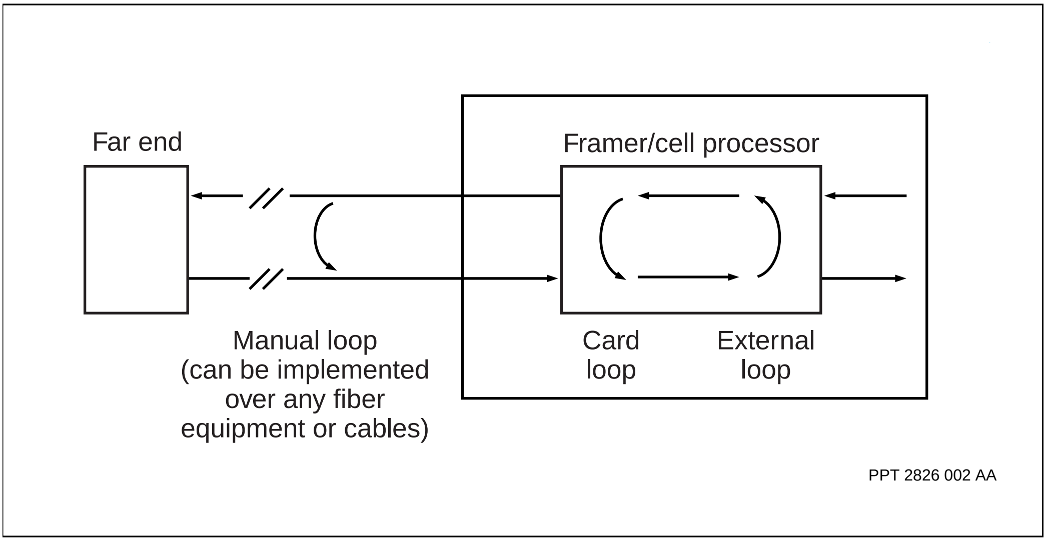
Card type	Port	Type of loopback test			Additional considerations
		Card	manual	externalLoop	
1-port OC-48/STM-16 ATM with APS	Sonet/SDH	X	X	X	“1-port OC-48/STM-16 ATM with APS FP tests additional considerations” (page 182)
1-port OC-48/STM-16 POS	Sonet/SDH	X	X	X	“1-port OC-48/STM-16 POS FP tests additional considerations” (page 182)

1-port OC-48/STM-16 ATM with APS FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - — Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set.

The figure “Data paths for 1-port OC-48/STM-16 ATM with APS FP port tests and loopbacks” (page 182) displays the data path for each test and loopback.

Figure 57
Data paths for 1-port OC-48/STM-16 ATM with APS FP port tests and loopbacks

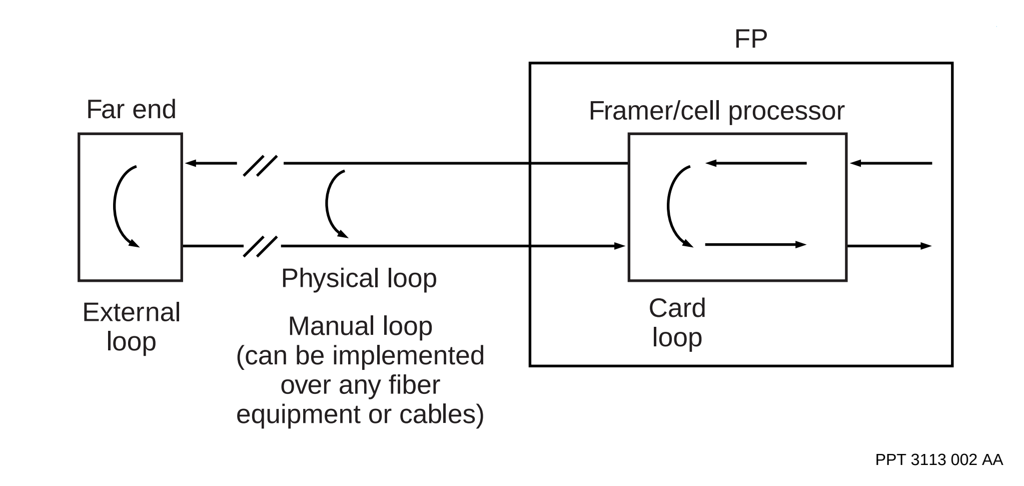


1-port OC-48/STM-16 POS FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - — Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set.

The figure “Data paths for 1-port OC-48/STM-16 POS FP port tests and loopbacks” (page 183) displays the data path for each test and loopback.

Figure 58
Data paths for 1-port OC-48/STM-16 POS FP port tests and loopbacks



Passport 15000 or 20000 STM-1FP tests

Table 31
Passport 15000 or 20000 STM-1 FP tests

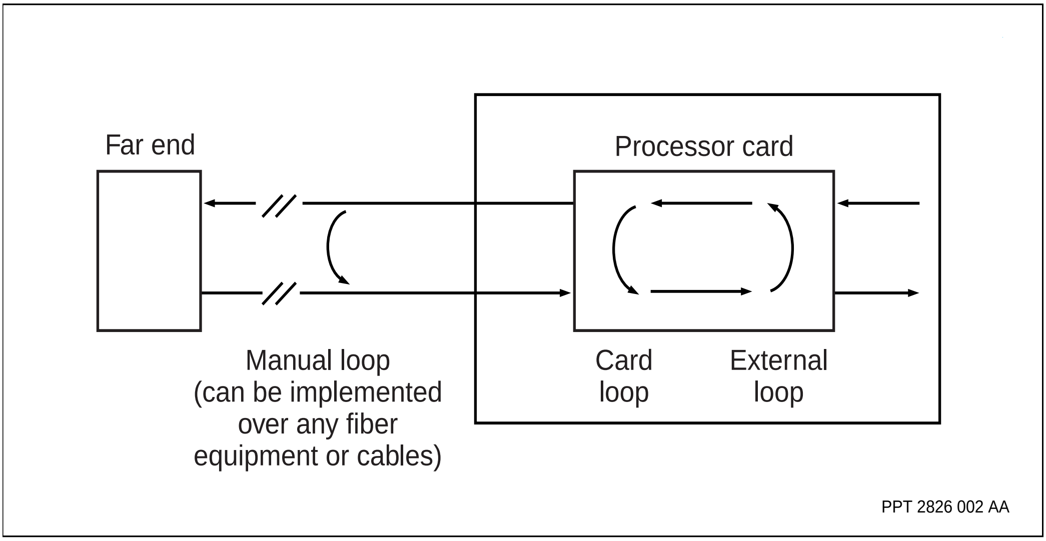
Card type	Port	Type of loopback test				Additional Considerations
		Card	manual	externalLoop	v54RemoteLoop	
1-port STM-1 channelized	Sdh	X	X	X		“1-port STM-1 channelized FP tests additional considerations” (page 184)
	E1	X	X	X		
	Channel		X	X	X	

1-port STM-1 channelized FP tests additional considerations

The figure “Data paths for 1-port STM-1 channelized FP port tests and loopbacks” (page 184) shows the data paths for each test and loopback.

- “V.54 remote loopback test” (page 110)
  - See “V.54 remote loopback testing on a 1-port STM-1 channelized FP” (page 184) for additional information about the V.543 remote loopback test on the 1-port STM-1 channelized FP.

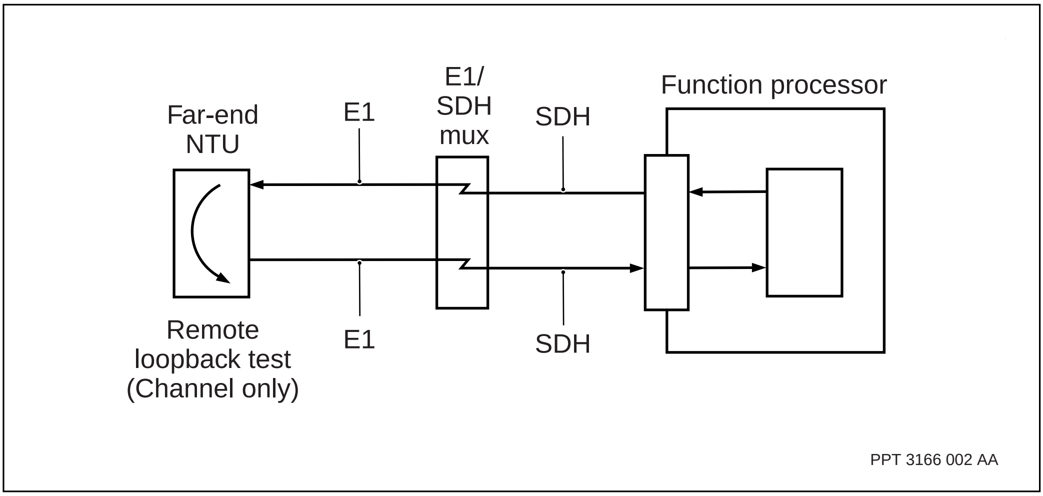
Figure 59
Data paths for 1-port STM-1 channelized FP port tests and loopbacks



V.54 remote loopback testing on a 1-port STM-1 channelized FP

For the 1-port STM-1 channelized single-mode intermediate reach frame relay FP, you can use the V.54 test to test a single channel down to the individual DS0 level, as well as to test multiple channels simultaneously. To test a channel on a 1pSTM1ChSmIr frame relay FP, the connections to the network termination unit (NTU) must be up and running as shown in the figure “V.54 remote loopback test on a channelized 1-port STM-1 SmIr frame relay FP” (page 185). In this configuration, a multiplexor must be present to convert the SDH to an E1, since the 1pSTM1ChSmIr frame relay FP is SDH-based, while the NTU ports are E1-based. Individual FPs support the V.54 remote loopback test differently.

Figure 60
V.54 remote loopback test on a channelized 1-port STM-1 SmIr frame relay FP



Other Passport 15000 or 20000 FP tests

Table 32
Other Passport 15000 or 20000 FPs

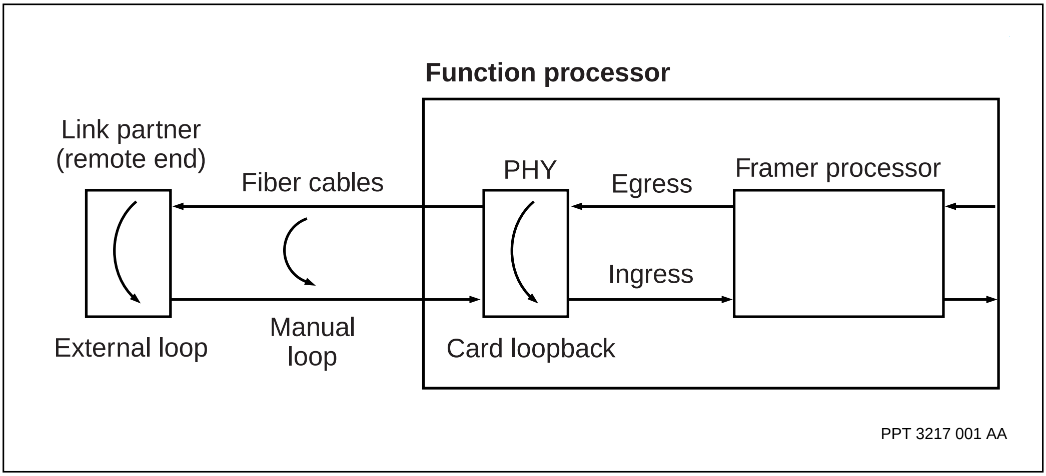
Card type	Port	Type of loopback test				Additional considerations
				Card	manual	
4-port Gigabit Ethernet	ethernet			X	X	“4-port Gigabit Ethernet FP tests additional considerations” (page 185)

4-port Gigabit Ethernet FP tests additional considerations

- “Manual tests using a physical loopback” (page 106):
  - Ensure that the loop lengths are within the required range and the *lineLength* provisionable attribute is properly set.

The figure “Data paths for 4-port Gigabit Ethernet FP port tests and loopbacks” (page 186) displays the data path for each test and loopback.

Figure 61
Data paths for 4-port Gigabit Ethernet FP port tests and loopbacks



Chapter 9
Testing ports and interfaces

Test ports and interfaces to identify and remedy problems with Passport function processors.

- “Prerequisites to testing ports and interfaces” (page 187)
- “Testing ports and interfaces task flow” (page 187)

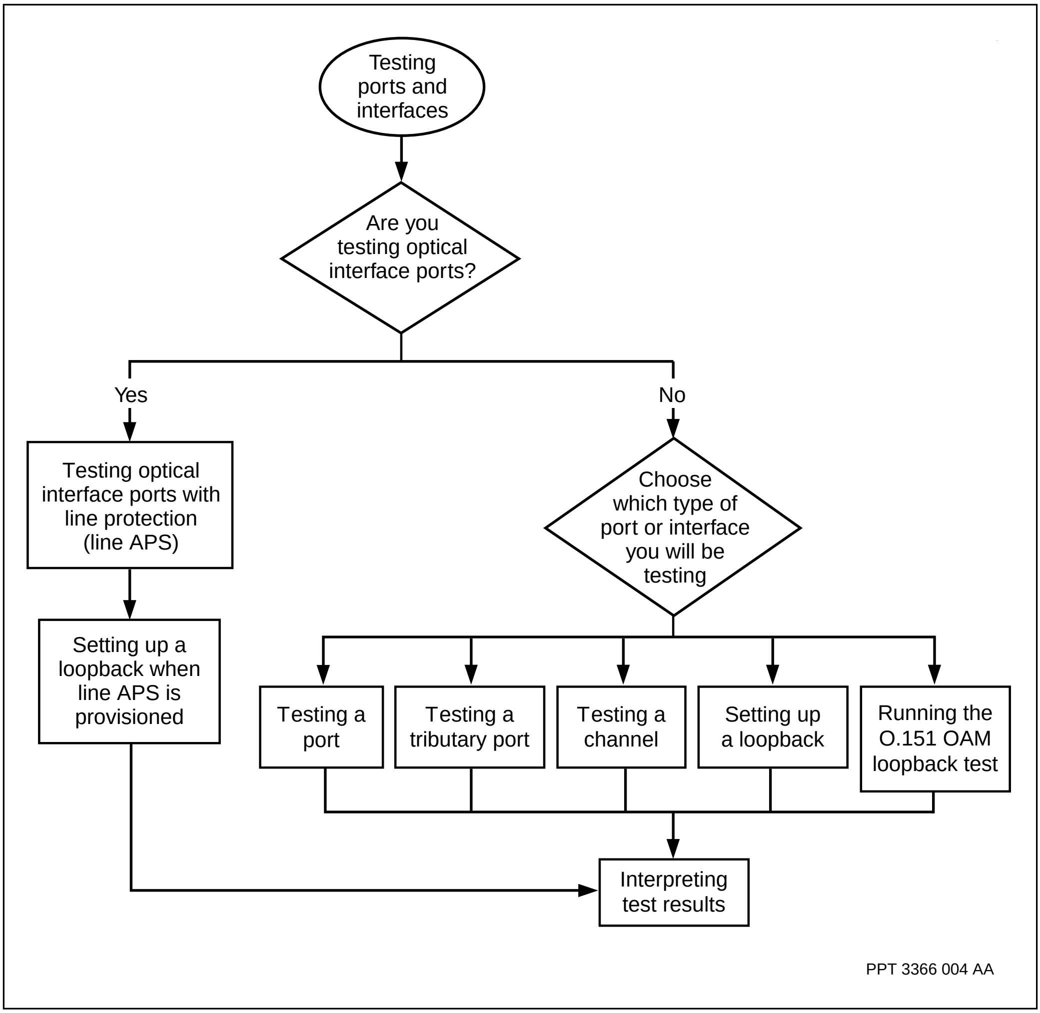
Prerequisites to testing ports and interfaces

- For instructions on testing a port or related component, refer to “Function processor port test types” (page 103) to check for special instructions.
- See “Function processor port test types” (page 103) for a description of the different types of tests.
- For information on test attributes and possible values, use the help command for the port type or refer to 241-5701-060 *Passport 7400, 15000, 20000 Components*.

Testing ports and interfaces task flow

This task flow shows you the sequence of procedures you perform to test ports and interfaces. To link to any procedure, go to “Task flow navigation” (page 188).

Figure 62
Testing ports and interfaces task flow



Task flow navigation

- “Testing optical interface ports with line protection (line APS)” (page 190)
- “Setting up a loopback when line APS is provisioned” (page 194)
- “Testing a port” (page 196)

Testing optical interface ports with line protection (line APS)

Test optical interface ports with line protection (line APS) to ensure that line APS is fully functional, and supports automatic and manual switches between the working and the protection line. Unidirectional mode is automatic during testing, regardless of the configured mode setting.

Prerequisites

- See “Supporting information for optical port and component tests” (page 224) for additional information

Procedure steps

1 Lock the *Aps* component to be tested:

`lock Aps/<a>`

2 Specify the test you want to run:

`set Aps/<a> Test type <testtype>`

3 Specify the number of minutes you want to run the test:

`set Aps/<a> Test duration <limit>`

Note: If you are performing a manual test with an external or payload loopback, ensure the external or payload loopback runs for a longer duration than the manual test.

4 If you want to specify other characteristics of the test, set the attributes appropriately:

`set Aps/<a> Test <attribute> <attributevalue>`

For information on test attributes and possible values, use the help command for the *Aps* component or refer to 241-5701-060 *Passport 7400, 15000, 20000 Components*.

5 If you specified the manual test in step 2, insert a physical loopback or arrange for a provisioned loopback at the far end. See the procedure “Setting up a loopback when line APS is provisioned” (page 194).

6 Start the test:

`start Aps/<a> Test`

7 If you want to see interim results while the test is running, display test statistics:

`display Aps/<a> Test results`

See “Interpreting test results” (page 220), for information about the test statistics that you have displayed.

8 If you want the test to run for the full duration, wait for the test timer to expire.

If you do not want the test to continue running, stop the test:

`stop Aps/<a> Test`

The system automatically displays the test results if you stop a test or when the test ends. See “Interpreting test results” (page 220), for an analysis of the diagnostic test results.

9 If you ran the manual test, arrange to remove the loopback you set up in step 5.

10 Restore service to the *Aps* component:

`unlock Aps/<a>`

11 Unlock the APS component.

`unlock aps/<a>`

Variable definitions

Variable	Value
<a>	is the instance number of the *Aps* component.
<attribute>	is the name of the attribute.
<attributevalue>	is the value for the attribute.
<limit>	specifies the maximum length of time (in minutes) that the test can run. The default value is 1.00.
<testtype>	is card or manual.

Procedure job aid

Figure 63
Testing optical interface ports with line protection (line APS) for Passport 7400 component hierarchy

- **EM**
  - **AutomaticProtectionSwitching**
    - **Test**
      - Setup
        - purpose
        - type
        - frmSize (size)
        - frmPatternType (fpt)
        - customizedPattern (cp)
        - dataStartDelay (dsd)
        - displayInterval (di)
        - duration
      - Results
        - elapsedTime
        - timeRemaining
        - causeOfTermination
        - bitsTx
        - bytesTx
        - frmTx
        - bitsRx
        - bytesRx
        - frmRx
        - erroredFrmRx
        - bitErrorRate

PPT 2930 024 AA

Figure 64
testing optical interfaces with line protection (line APS) for Passport 15000 and 20000 component hierarchy

- **EM**
  - **LineAutomaticProtectionSwitching**
    - **Test**
      - Setup
        - purpose
        - type
        - frmSize (size)
        - frmPatternType (fpt)
        - customizedPattern (cp)
        - dataStartDelay (dsd)
        - displayInterval (di)
        - duration
      - Results
        - elapsedTime
        - timeRemaining
        - causeOfTermination
        - bitsTx
        - bytesTx
        - frmTx
        - bitsRx
        - bytesRx
        - frmRx
        - erroredFrmRx
        - bitErrorRate

PPT 2930 025 AA

Setting up a loopback when line APS is provisioned

Set up a loopback when line APS is provisioned to ensure that the connection between a a near and far end node is operational.

Prerequisites

- A software loopback must be in place at all times during manual loopback tests involving an external or payload loopback.
- Ensure the payload or external loopback on the far-end node starts before the manual test starts on the target node and lasts for a longer duration than the manual test on the target node.
- See the section "Supporting information for optical port and component tests" (page 224) for additional information about this procedure.

Procedure steps

1 Verify that the *Aps* component is either receiving a clock source from the line or providing its own clock source:

`display Aps/<a> clockingSource`

2 Lock the *Aps* component:

`lock Aps/<a>`

3 Specify the type of loopback you want to run:

`set Aps/<a> Test type <type>`

4 Specify the number of minutes you want the loopback to run:

`set Aps/<a> Test duration <limit>`

Note: Ensure the external or payload loopback runs for a longer duration than the manual loopback test.

5 Start the loopback:

`start Aps/<a> Test`

Note: Ensure you start the external or payload loopback before the manual loopback test.

6 Wait until the operator at the far end indicates that testing is complete.

7 If you want the loopback to run for the full duration, wait for the test timer to expire.

If you do not want the loopback to continue running, stop the test:

```
stop Aps/<a> Test
```

8 Unlock the port on the LP that you used for the loopback:

```
unlock Aps/<a>
```

Variable definitions

Variable	Value
<a>	is the instance number of the *Aps* component.
<limit>	specifies the maximum length of time (in minutes) that the test can run. The default value is 1.00.
<type>	is *externalLoop* or *payloadLoop*.

Testing a port

Test a port to ensure the operability of the ports on a Passport FP.

Prerequisites

- See “Function processor port test types” (page 103) to determine which type of test to run.
- If you are performing a manual test with an external or payload loopback, ensure the external or payload loopback runs for a longer duration than the manual test.

Procedure steps

1 Lock the port you want to test:

`lock Lp/<n> <port>/<p>`

2 Specify the test you want to run:

`set Lp/<n> <port>/<p> Test type <testtype>`

3 Specify the number of minutes you want to run the test:

`set Lp/<n> <port>/<p> Test duration <limit>`

4 If you want to specify other characteristics of the port test, set the test attributes under the operational group Setup appropriately:

`set Lp/<n> <port>/<p> Test <attribute> <attributevalue>`

5 If you specified the manual test in step 2, insert a physical loopback or arrange for a provisioned loopback at the far end. See the procedure “Setting up a loopback” (page 204).

6 Start the port test:

`start Lp/<n> <port>/<p> Test`

7 If you want to see interim results while the test is running, display test statistics:

`display Lp/<n> <port>/<p> Test results`

See “Interpreting test results” (page 220), for information about the test statistics that you have displayed.

8 If you want the test to run for the full duration, wait for the test timer to expire.

If you do not want the test to continue running, stop the test:

`stop Lp/<n> <port>/<p> Test`

9 If you ran the manual test, arrange to remove the loopback you set up in step 5.

10 Restore service to the port:

`unlock Lp/<n> <port>/<p>`

Variable definitions

Variable	**Value**
<attribute>	is the name of the attribute.
<attributevalue>	is the value for the attribute.
<limit>	specifies the maximum length of time (in minutes) that the test can run. The default value is 1.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
<testtype>	is the type of test. For information on possible values, use the help command for the port type or refer to 241-5701-060 *Passport 7400, 15000, 20000 Components*.

Procedure job aid

Figure 65
Port test components and attributes

- **EM**
  - **LogicalProcessor (Lp)**
    - **<port>**
      - **Test**
        - Setup
          - purpose
          - type
          - frmSize (size)
          - frmPatternType (fpt)
          - customizedPattern (cp)
          - dataStartDelay (dsd)
          - displayInterval (di)
          - duration
        - Results
          - elapsedTime
          - timeRemaining
          - causeOfTermination
          - bitsTx
          - bytesTx
          - frmTx
          - bitsRx
          - bytesRx
          - frmRx
          - erroredFrmRx
          - bitErrorRate

PPT 2930 022 AA

Testing a tributary port

Test a tributary port to test the performance of the tributary port on the FP.

Prerequisites

- See “Interpreting test results” (page 220), for information about the test statistics and for an analysis of the diagnostic test results.

Procedure steps

1 Lock the tributary port you want to test:

```
lock Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q>
```

2 Specify the tributary port test:

```
set Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q> Test type loopthistrib
```

3 Specify the number of minutes you want to run the test:

```
set Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q> Test duration <limit>
```

4 If you want to specify other characteristics of the tributary port test, set the test attributes appropriately:

```
set Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q> Test <attribute> <attributevalue>
```

5 Start the tributary port test:

```
start Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q> Test
```

6 If you want to see interim results while the test is running, display test statistics:

```
display Lp/<n> <port>/<p> [<subcomponents>]
<trib_port>/<q> Test results
```

7 If you want the test to run for the full duration, wait for the test timer to expire.

If you do not want the test to continue running, stop the test:

```
stop Lp/<n> <port>/<p> [<subcomponents>] <trib_port>/
<q> Test
```

8 Restore service to the tributary port:

```
unlock Lp/<n> <port>/<p> [<subcomponents>]
<trib_port>/<q>
```

Variable definitions

Variable	Value
<attribute>	is the name of the attribute.
<attributevalue>	is the value for the attribute.
<limit>	specifies the maximum length of specifies the maximum length of time (in minutes) that the test can run. The default value is 1.00.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
<q>	is the tributary port number.
<subcomponents>	is optional, representing any subcomponents that have provisionable attributes. Channelized optical cards may have path or channel subcomponents that need to be specified.
<trib_port>	s the tributary port type.

Testing a channel

Test a channel to ensure the operation of the channels on a Passport FP.

Prerequisites

- See “Interpreting test results” (page 220), for information about the test statistics and for an analysis of the diagnostic test results.

Procedure steps

> **CAUTION**
> **Risk of momentary service interruption**
> Nortel Networks recommends against performing a channel test on the 4-port DS1 FP while in service. Performing this test on this FP results in a loss of frame (LOF) alarm appearing on the port to which the tested channel belongs. The LOF condition is a red alarm that causes all the channels on the port to fail momentarily. The channels and voice services recover after the LOF is cleared during the course of the test. Channel tests on timeslot 16 are not supported on the 4-port E1 MVP-E FP.

1 Lock the channel you want to test:

lock Lp/<n> <port>/<p> [<subcomponents>] Chan/<r>

2 Specify the test you want to run:

set Lp/<n> <port>/<p> [<subcomponents>] Chan/<r> Test type <testtype>

3 Specify the number of minutes you want to run the test:

set Lp/<n> <port>/<p> [<subcomponents>] Chan/<r> Test duration <limit>

4 If you want to specify other characteristics of the test, set the test attributes appropriately:

set Lp/<n> <port>/<p> [<subcomponents>] Chan/<r> Test <attribute> <attributevalue>

5 If you specified the manual test in step 2, insert a physical loopback or arrange for a provisioned loopback at the far end. See the procedure “Setting up a loopback” (page 204).

6 Start the channel test:

```
start Lp/<n> <port>/<p> [<subcomponents>] Chan/<r>
Test
```

7 If you want to see interim results while the test is running, display test statistics:

```
display Lp/<n> <port>/<p> [<subcomponents>] Chan/<r>
Test results
```

8 If you want the test to run for the full duration, wait for the test timer to expire.

If you do not want the test to continue running, stop the test:

```
stop Lp/<n> <port>/<p> [<subcomponents>] Chan/<r> Test
```

9 If you ran the manual test, arrange to remove the loopback you set up in step 5.

10 Restore service to the channel:

```
unlock Lp/<n> <port>/<p> [<subcomponents>] Chan/<r>
```

Variable definitions

Variable	Value
<attribute>	is the name of the attribute.
<attributevalue>	is the value for the attribute.
<limit>	specifies the maximum length of time (in minutes) that the test can run. The default value is 1.00.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
<r>	is the channel number.
(Sheet 1 of 2)	

Variable	Value
<subcomponents>	is optional, representing any subcomponents that have provisionable attributes. Channelized optical cards may have path or channel subcomponents that need to be specified.
<testtype>	is card, manual, remoteLoop. See “Function processor port test types” (page 103) to determine which type of test to run.
(Sheet 2 of 2)	

Setting up a loopback

Set up a loopback to perform a loopback test on a Passport FP.

Prerequisites

- A software loopback must be in place at all times during manual loopback tests involving an external or payload loopback.
- Ensure the payload or external loopback on the far-end node starts before the manual test starts on the target node and lasts for a longer duration than the manual test on the target node.
- For the 1-port OC-48/STM-16 ATM with APS FP, you can use this procedure only if you have not provisioned line APS on the FP. If you have provisioned line APS on this FP, use the procedure "Setting up a loopback when line APS is provisioned" (page 194).

Procedure steps

1 Verify that the port or channel is either receiving a clock source from the line or providing its own clock source:

```
display Lp/<n> <port>/<p> [<subcomponents>]
clockingSource
```

2 Lock the port or channel on the LP that you are using for the loopback:

```
lock Lp/<n> <port>/<p> [<subcomponents>]
```

3 Specify the type of loopback you want to run:

```
set Lp/<n> <port>/<p> [<subcomponents>] Test type
<type>
```

4 Specify the number of minutes you want the loopback to run. Ensure the external or payload loopback runs for a longer duration than the manual loopback test.

```
set Lp/<n> <port>/<p> [<subcomponents>] Test duration
<limit>
```

5 Start the loopback. Ensure you start the external or payload loopback before the manual loopback test.

```
start Lp/<n> <port>/<p> [<subcomponents>] Test
```

6 Wait until the operator at the far end indicates that testing is complete.

7 If you want the loopback to run for the full duration, wait for the test timer to expire.

If you do not want the loopback to continue running, stop the test:

```
stop Lp/<n> <port>/<p> [<subcomponents>] Test
```

8 Unlock the port or channel on the LP that you used for the loopback:

```
unlock Lp/<n> <port>/<p> [<subcomponents>]
```

Variable definitions

Variable	Value
<limit>	specifies the maximum length of time (in minutes) that the test can run. The default value is 1.00.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
<subcomponents>	is optional, representing any subcomponents that have provisionable attributes. Channelized optical cards may have path or channel subcomponents that need to be specified.
<type>	is localloop, externalloop, payloadloop, v54remoteloop, or pn127remoteloop.

Running the O.151 OAM loopback test

The example scenarios that follow have the NTHW24 card installed in slot 15 of a Passport 15000 switch. Enter the commands in the configuring mode of software operation (prov) through a local operator terminal that is temporarily connected to the control processor (CP) of the Passport 15000, or through a Preside Multiservice Data Manager (MDM).

> ***Note:*** The scenarios assume that you have completed all other Passport 15000 software configuring (provisioning) required in the network, but not necessarily the port and asynchronous transfer mode (ATM) layer on the card and port being used for the test.

Prerequisites

- An NTHW24 card must be installed and in service in a Passport 15000. For physical card installation, see 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*.
- To be able to run the loopback test in a network, the service provider needs one hop between its equipment and NTT (Nippon Telegraph and Telecommunications).
- You must configure the Passport 15000 software for function processor (FP) cards of type 16-port OC-3/STM-1. You must also include anything specific to the 16-port OC-3/STM-1 ATM cards, for example, enabling the loopback test or establishing 1+1 sparing with an adjacent mate. The software name of the card is the same as the other 16-port OC-3/STM-1s, that is, *16pOC3SmIrAtm*.
- The software for the 16-port OC-3/STM-1 card must be configured before the card is seated and powered up.
- For the duration of the test, configure the connection being tested as CBR running at PCR. This prevents the test from being affected by other VCs and VPs through the same port.
- Ensure that the sum of the loopback bandwidth and all other traffic through the port does not exceed the overall OC-3/STM-1 bandwidth (line rate). The intent is to prevent starving the test or other traffic, especially if some of it is also CBR.

- When the NTHW24 is powered up and its status LED is solid green, it is available to run the loopback test. To run the loopback test externally, all equipment that is involved in the connection must also be in service.
- When two NTHW24 cards are configured for dual FP APS equipment protection and a switchover occurs, maintaining an in-progress O.151 loopback test is unsupported. The loopback test may survive the switchover.
- You can run the loopback test through more than one port simultaneously up to the 16 ports on the card.
- You can configure the loopback test from a local operator terminal that is temporarily connected to the Passport 15000 or from a Preside Multiservice Data Manager (MDM).

Navigation

The example scenarios are:

- “Configuring and running a pre-cutover test for a VP” (page 208)
- “Configuring and running a fault analysis test for a VP” (page 210)
- “Configuring and running a pre-cutover test for a VC” (page 213)
- “Configuring and running a fault analysis test for a VC” (page 216)

Configuring and running a pre-cutover test for a VP

The following procedure is an example of how to set up and run the O.151 OAM proprietary loopback test for a VP during a pre-cutover period.

1 At the front of the Passport 15000, identify the slot number of the installed NTHW24 card. This procedure uses slot 15 as an example. In software, the attribute *cardType* does not indicate if the *16pOC3SmIrAtm* is an NTHW24. You can identify the card by the product engineering code (PEC) NTHW24 on the faceplate or by entering this command for each slot number:

`display shelf card/* productCode`

2 Add and configure an *AtmIf* by entering the following series of commands.

a. Confirm that the card type is *16pOC3SmIrAtm*.

`display shelf card/15`

b. Identify the name of the *logicalProcessorType*. In this example it is ATM1415APS.

`display lp/15`

c. Confirm that the software of the logical processor already has the ATM feature *atmCore* in its *featureList*.

`display sw lpt/ATM1415APS`

d. Add a port for the loopback test to pass through. In this example, SONET is used. SDH is also acceptable.

`add lp/15 sonet/15`

e. Add a SONET or SDH path through the port.

`add lp 15 sonet/15 sts/0`

f. Add the ATM interface.

`add atmif/1515`

g. Confirm the ATM interface is created for *interfaceName*.

`display atmif/1515`

The default values for this card can be used by the test.

h. Link the ATM interface to a physical port.

`set atmif/1515 interface lp/15 sonet/15 sts/0`

i. Confirm the link has been established.

display atmif/1515

3 Configure a PVP for the loopback path through the port by the following series of commands. (If a provisioned connection using the desired VPI combination for the test already exists, it must first be deleted.)

a. Create a VP with a user-selected VPI for the connection.

add atmif/1515 vpc/2

b. Define the PVP traffic contract of the loopback connection by setting the transmit traffic type descriptor type (txtdt) and parameters (txtdp), and the ATM service category (serv).

set atmif/1515 vpc/2 vcd tm txtdt 3, txtdp 1 230000, serv cbr

CBR is chosen for the service class so that the OAM test cells have a greater chance of passing through the connection if other traffic is present on the port. This CBR contends for the same bandwidth as all other simultaneous CBR traffic on the same port. To avoid potential traffic contention at full or near-full OC-3 bandwidth contracts, you must run the out-of-service loopback test on the entire port. The cell count of 230000 was chosen as an example contract.

c. Designate that the connection on the NTHW24 is a nailed-up relay point (nrp) for the loopback.

add atmif/1515 vpc/2 nrp

d. Have the test cells loop back through the same connection, that is, point to itself such that the loopback signal enters (Rx) and exits (Tx) the same port.

set atmif/1515 vpc/2 nrp nexthop atmif/1515 vpc/2 nrp

4 The NTHW24 is ready to receive and loop back O.151 OAM VP test cells. You can start the NTT O.151 loopback test at any time. There is no minimum running time for the test to provide results.

5 Cancel having Vpc 2 available for OAM proprietary testing so the VP can be re-assigned normal traffic.

delete vpc/2

6 If desired, configure a soft PVP on the tested VP to call a far-end port, for example, on another Passport 15000.

add vpc/2 src

For more information on configuring soft PVPs, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

Configuring and running a fault analysis test for a VP

The following procedure is an example of how to set up and run the O.151 OAM proprietary loopback test for a VP as an exercise of fault analysis.

1 At the front of the Passport 15000, identify the slot number of the installed NTHW24 card. This procedure uses slot 15 as an example. In software, the attribute *cardType* does not indicate if the *16pOC3SmIrAtm* is an NTHW24. You can identify the card by the product engineering code (PEC) NTHW24 on the faceplate or by entering this command for each slot number:

`display shelf card/* productCode`

2 Add and configure an *AtmIf* by entering the following series of commands.

a. Confirm that the card type is *16pOC3SmIrAtm*.

`display shelf card/15`

b. Identify the name of the *logicalProcessorType*. In this example it is ATM1415APS.

`display lp/15`

c. Confirm that the software of the logical processor already has the ATM feature *atmCore* in its *featureList*.

`display sw lpt/ATM1415APS`

d. Add a port for the loopback test to pass through. In this example, SONET is used. SDH is also acceptable.

`add lp/15 sonet/15`

e. Add a SONET or SDH path through the port.

`add lp 15 sonet/15 sts/0`

f. Add the ATM interface.

`add atmif/1515`

g. Confirm the ATM interface is created for *interfaceName*.

`display atmif/1515`

The default values for this card can be used by the test.

h. Link the ATM interface to a physical port.

set atmif/1515 interface lp/15 sonet/15 sts/0

i. Confirm the link has been established.

display atmif/1515

3 Delete the path being used to transmit traffic across the network, that is, the same one that was created at the end of the procedure "Configuring and running a pre-cutover test for a VP" (page 208).

delete vpc/2 src

4 Configure a PVP for the loopback path through the port by the following series of commands.

a. Define the PVP traffic contract of the loopback connection by setting the transmit traffic type descriptor type (txtdt) and parameters (txtdp), and the ATM service category (serv).

set atmif/1515 vpc/2 vcd tm txtdt 3, txtdp 1 230000, serv cbr

CBR is chosen for the service class so that the OAM test cells have a greater chance of passing through the connection if other traffic is present on the port. This CBR contends for the same bandwidth as all other simultaneous CBR traffic on the same port. To avoid potential traffic contention at full or near-full OC-3 bandwidth contracts, you must run the out-of-service loopback test on the entire port. The cell count of 230000 was chosen as an example contract.

b. Designate that the connection on the NTHW24 is a nailed-up relay point (nrp) for the loopback.

add atmif/1515 vpc/2 nrp

c. Have the test cells loop back through the same connection, that is, point to itself such that the loopback signal enters (Rx) and exits (Tx) the same port.

set atmif/1515 vpc/2 nrp nexthop atmif/1515 vpc/2 nrp

5 Check, activate, and confirm the configuring changes for the software to use them.

check prov

activate prov

confirm prov

6 The NTHW24 is ready to receive and loop back O.151 OAM test cells for fault analysis. You can start the NTT O.151 loopback test at any time. There is no minimum running time for the test to provide results.

7 Cancel having Vpc 2 available for OAM proprietary testing so the VP can be re-assigned normal traffic.

```
delete vpc/2
```

8 Restore the former configuring of the connection which was in place at the beginning of the test.

```
add vpc/2 src
```

For more information on configuring soft PVPs, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

Configuring and running a pre-cutover test for a VC

The following procedure is an example of how to set up and run the O.151 OAM proprietary loopback test for a VC during a pre-cutover period.

1 At the front of the Passport 15000, identify the slot number of the installed NTHW24 card. This procedure uses slot 15 as an example. In software, the attribute *cardType* does not indicate if the *16pOC3SmIrAtm* is an NTHW24. You can identify the card by the product engineering code (PEC) NTHW24 on the faceplate or by entering this command for each slot number:

`display shelf card/* productCode`

2 Add and configure an *AtmIf* by entering the following series of commands.

a. Confirm that the card type is *16pOC3SmIrAtm*.

`display shelf card/15`

b. Identify the name of the *logicalProcessorType*. In this example it is ATM1415APS.

`display lp/15`

c. Confirm that the software of the logical processor already has the ATM feature *atmCore* in its *featureList*.

`display sw lpt/ATM1415APS`

d. Add a port for the loopback test to pass through. In this example, SONET is used. SDH is also acceptable.

`add lp/15 sonet/15`

e. Add a SONET or SDH path through the port.

`add lp 15 sonet/15 sts/0`

f. Add the ATM interface.

`add atmif/1515`

g. Confirm the ATM interface is created for *interfaceName*.

`display atmif/1515`

The default values for this card can be used by the test.

h. Link the ATM interface to a physical port.

`set atmif/1515 interface lp/15 sonet/15 sts/0`

i. Confirm the link has been established.

display atmif/1515

3 Configure a PVC for the loopback path through the port by the following series of commands. (If a provisioned connection using the desired VPI.VCI combination for the test already exists, it must first be deleted.)

a. Create a VC with VPI and VCI instance the same as the user-selected VPI and VCI for the connection.

add atmif/1515 vcc/8.32

b. Define the PVC traffic contract of the loopback connection by setting the transmit traffic type descriptor type (txtdt) and parameters (txtdp), and the ATM service category (serv).

set atmif/1515 vcc/8.32 vcd tm txtdt 3, txtdp 1 230000, serv cbr

CBR is chosen for the service class so that the OAM test cells have a greater chance of passing through the connection if other traffic is present on the port. This CBR contends for the same bandwidth as all other simultaneous CBR traffic on the same port. To avoid potential traffic contention at full or near-full OC-3 bandwidth contracts, you must run the out-of-service loopback test on the entire port. The cell count of 230000 was chosen as an example contract.

c. Designate that the connection on the NTHW24 is a nailed-up relay point (nrp) for the loopback.

add atmif/1515 vcc/8.32 nrp

d. Have the test cells loop back through the same connection, that is, point to itself such that the loopback signal enters (Rx) and exits (Tx) the same port.

set atmif/1515 vcc/8.32 nrp nexthop atmif/1515 vcc/8.32 nrp

4 Optimize memory management for the card by setting up the connmap using the following series of commands.

a. Add a connection map.

add atmif/1515 connmap

b. Display the settings of the connection map.

display atmif/1515 connmap ov

The default settings are:
numVccsForVpiZero = 768
numNonZeroVpisForVccs = 0

firstNonZeroVpiForVccs = 1
numVccsPerNonZeroVpi = 64

c. Change the default VP number to match the one you selected. In this procedure it is 8 (from 8.32).

set atmif/1515 connmap ov numNonZeroVpisForVccs 8

d. If the other 3 default values have been changed, you may have to use the following connection administrator (ca) commands to adjust the values to accommodate the connection mapping of other connections through the test port.

display atmif/1515 ca

set atmif/1515 ca maxAutoSelectedVciForVpiZero <value>

For information on connection mapping, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

e. Confirm the connection map values are appropriate.

display atmif/1515 connmap ov

5 Check, activate, and confirm the configuring changes for the software to use them.

check prov

activate prov

confirm prov

6 The NTHW24 is ready to receive and loop back O.151 OAM VC test cells. You can start the NTT O.151 loopback test at any time. There is no minimum running time for the test to provide results.

7 Cancel having VCC 8.32 available for OAM proprietary testing so the VC can be re-assigned normal traffic.

delete vcc/8.32

8 If desired, configure a soft PVC on the tested VC to call a far-end port, for example, on another Passport 15000.

add vcc/8.32 src

For more information on configuring soft PVCs, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

Configuring and running a fault analysis test for a VC

The following procedure is an example of how to set up and run the O.151 OAM proprietary loopback test for a VC as an exercise of fault analysis.

1 At the front of the Passport 15000, identify the slot number of the installed NTHW24 card. This procedure uses slot 15 as an example. In software, the attribute *cardType* does not indicate if the *16pOC3SmIrAtm* is an NTHW24. You can identify the card by the product engineering code (PEC) NTHW24 on the faceplate or by entering this command for each slot number:

`display shelf card/* productCode`

2 Add and configure an *AtmIf* by entering the following series of commands.

a. Confirm that the card type is *16pOC3SmIrAtm*.

`display shelf card/15`

b. Identify the name of the *logicalProcessorType*. In this example it is ATM1415APS.

`display lp/15`

c. Confirm that the software of the logical processor already has the ATM feature *atmCore* in its *featureList*.

`display sw lpt/ATM1415APS`

d. Add a port for the loopback test to pass through. In this example, SONET is used. SDH is also acceptable.

`add lp/15 sonet/15`

e. Add a SONET or SDH path through the port.

`add lp 15 sonet/15 sts/0`

f. Add the ATM interface.

`add atmif/1515`

g. Confirm the ATM interface is created for *interfaceName*.

`display atmif/1515`

The default values for this card can be used by the test.

h. Link the ATM interface to a physical port.

`set atmif/1515 interface lp/15 sonet/15 sts/0`

i. Confirm the link has been established.

`display atmif/1515`

3 Delete the channel connection being used to transmit traffic across the network, that is, the same one that was created at the end of the procedure “Configuring and running a pre-cutover test for a VP” (page 208).

```
delete vcc/8.32
```

4 Configure a PVC for the loopback path through the port by the following series of commands.

a. Create a VC with VPI and VCI instance the same as the user-selected VPI and VCI for the connection.

```
add atmif/1515 vcc/8.32
```

b. Define the PVC traffic contract of the loopback connection by setting the transmit traffic type descriptor type (txtdt) and parameters (txtdp), and the ATM service category (serv).

```
set atmif/1515 vcc/8.32 vcd tm txtdt 3, txtdp 1
230000, serv cbr
```

CBR is chosen for the service class so that the OAM test cells have a greater chance of passing through the connection if other traffic is present on the port. This CBR contends for the same bandwidth as all other simultaneous CBR traffic on the same port. To avoid potential traffic contention at full or near-full OC-3 bandwidth contracts, you must run the out-of-service loopback test on the entire port. The cell count of 230000 was chosen as an example contract.

c. Designate that the connection on the NTHW24 is a nailed-up relay point (nrp) for the loopback.

```
add atmif/1515 vcc/8.32 nrp
```

d. Have the test cells loop back through the same connection, that is, point to itself such that the loopback signal enters (Rx) and exits (Tx) the same port.

```
set atmif/1515 vcc/8.32 nrp nexthop atmif/1515 vcc/
8.32 nrp
```

5 Optimize memory management for the card by setting up the connmap using the following series of commands.

a. Add a connection map.

```
add atmif/1515 connmap
```

b. Display the settings of the connection map.

display atmif/1515 connmap ov

The default settings are:

numVccsForVpiZero = 768
numNonZeroVpisForVccs = 0
firstNonZeroVpiForVccs = 1
numVccsPerNonZeroVpi = 64

c. Change the default VP number to match the one you selected. In this procedure it is 8 (from 8.32).

set atmif/1515 connmap ov numNonZeroVpisForVccs 8

d. If the other 3 default values have been changed, you may have to use the following connection administrator (ca) commands to adjust the values to accommodate the connection mapping of other connections through the test port.

display atmif/1515 ca

set atmif/1515 ca maxAutoSelectedVciForVpiZero <value>

For information on connection mapping, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

e. Confirm the connection map values are appropriate.

display atmif/1515 connmap ov

6 Check, activate, and confirm the configuring changes for the software to use them.

check prov

activate prov

confirm prov

7 The NTHW24 is ready to receive and loop back O.151 OAM test cells for fault analysis. You can start the NTT O.151 loopback test at any time. There is no minimum running time for the test to provide results.

8 Cancel having VCC 8.32 available for OAM proprietary testing so the VC can be re-assigned normal traffic.

delete vcc/8.32

9 Restore the former configuration of the channel connection which was in place at the beginning of the test.

add vcc/8.32 src

For more information on configuring soft PVCs, see 241-5701-710 *Passport 7400, 15000, 20000 ATM Configuration Guide*.

Interpreting test results

Interpret test results to analyze the results of the port test with the results group of operation attributes under the *Test* component.You can display the full set of test results using the commands shown in the testing procedures. You can also display individual attributes. This section includes the following tables:

- “Result attributes” (page 220)
- “Test results” (page 221)

Result attributes

The following table “Result attributes” (page 220) provides a definition of each test attribute.

Table 33
Result attributes

Attribute	Definition
bitErrorRate	This attribute displays the calculated bit error rate on the link.
bitsRx	This attribute displays the total number of bits received during the test period.
bitsTx	This attribute displays the total number of bits sent during the test period.
bytesRx	This attribute displays the total number of bytes received during the test period.
bytesTx	This attribute displays the total number of bytes sent during the test period.
causeOfTermination	This attribute offers one of the following explanations for a port test that has ended: neverStarted: the port test has not been started testRunning: the port test is currently running testTimeExpired: the port test ran for the specified duration stoppedByOperator: a Stop command was issued
(Sheet 1 of 2)	

Table 33 (continued)
Result attributes

Attribute	Definition
elapsedTime	This attribute displays the length of time (in minutes) that the port test has been running.
erroredFrmRx	This attribute displays the total number of errored frames received during the test period.
frmRx	This attribute displays the total number of frames received during the test period.
frmTx	This attribute displays the total number of frames sent during the test period.
timeRemaining	This attribute displays the maximum length of time (in minutes) that the port test will continue to run before stopping.
(Sheet 2 of 2)	

Test results

The following table “Test results” (page 222) explains how to interpret test results. For each test, there are a number of steps suggested to correct the problems. You can rerun the test after you complete each step, or after you complete a set of remedial actions.

Table 34
Test results

Test type	Problem	Solution
Card test	No frames are received or errored frames are received	1) Replace the function processor. 2) Rerun the card test.
Manual test	No frames are received or errored frames are received	1) Check the far-end loop. 2) Check the cabling. 3) Ensure that both ends of the connection are provisioned properly. 4) Ensure that a clock source is available. 5) Remove devices that may be creating a noisy environment. 6) Run the card test. 7) Replace the function processor. 8) Rerun the manual test.
Local test	No frames are received or errored frames are received	1) Check the modem and modem connections. 2) Check the cabling. 3) Check the far-end loop. 4) Remove devices that may be creating a noisy environment. 5) Run the card test. 6) Run the manual loop test. 7) Replace the function processor. 8) Rerun the local test. 9) If applicable, check far-end DCE OSI state.
Remote test	No frames are received or errored frames are received	1) Check the channel service unit (CSU), its settings (whether the CSU supports inband remote loop), and its connections for the function processor. 2) If the function processor uses a modem, check the modem and modem connections. 3) Check the cabling. 4) Check the far-end loop. 5) Remove devices that may be creating a noisy environment. 6) Run the card test. 7) Run the manual loop test. 8) Replace the function processor. 9) Rerun the remote test.
(Sheet 1 of 2)		

Table 34 (continued)
Test results

Test type	Problem	Solution
V54 remote loop test or PN127 remote loop test	frmRx attribute not increasing after starting the test	It takes about six seconds to actually see the test data looped back for the CSU/DSU or NTU to respond to the loop-up pattern from the Passport node. If after six seconds, the frmRx counter is still not incrementing, the CSU/DSU or NTU is not triggered to loop back. Check if there is a connection problem with the CSU/DSU or NTU.
	Verification of loopback removal upon test completion	Since there is no acknowledgment for the loop-down pattern, it is hard to tell when the CSU/DSU or NTU is out of loopback mode. To make sure that the CSU/ DSU or NTU is out of loopback mode, perform another manual loop from the Passport node. If the loop is not down, then the frmTx and frmRx counters both increase. If the loop is down, then the frmRx counter does not increase.
	Errored frames received at the beginning of the test	Some of the CSU/DSU or NTU equipment takes longer to respond to the loop-up pattern. On the Passport node, you only have to wait for six seconds for the CSU/DSU to go into loopback mode and start sending the real test data. Meanwhile, the CSU/DSU or NUT responds to the loop-up pattern by sending the acknowledge pattern. If the reception of the acknowledge pattern finishes after the six second period, there are error frames. To avoid this condition, set the *dataStartDelay* attribute inside the *test* component to a value other than 0. The real test data starts after this specified time (in seconds).
	Random errored frames received during the test	A non-terminated V.35 cable connected to the CSU/ DSU or NTU can cause random error frames. A non-terminated cable can pick up noise that disrupts the normal test data and results in error frames. Check the cabling to make sure that this is not the problem.
(Sheet 2 of 2)		

Supporting information for optical port and component tests

For Passport 7400 the line APS *test* component is dynamically created when line APS is linked to a Sonet or Sdh port. Ports linked to line APS cannot be individually tested. Port tests are handled by the *APS* component using the *test* subcomponent. Testing involves only the currently active near and far-end channels.

The supported tests are the same as those supported on the Sonet/Sdh ports:

- card test
- manual test
- external loop test

When ports are linked by the *Aps* component, the ports cannot be tested individually. The tests work only on the active line. Line APS remains functional during the tests, supporting both manual and automatic switches between the ports. Further, line APS operates only in unidirectional mode during tests, regardless of the configured setting.

Chapter 10
Testing remote nodes for error detection for Passport 15000 and 20000 FPs

Test remote nodes for error detection for Passport 15000 and 20000 to ensure that the remote node is able to detect errors.

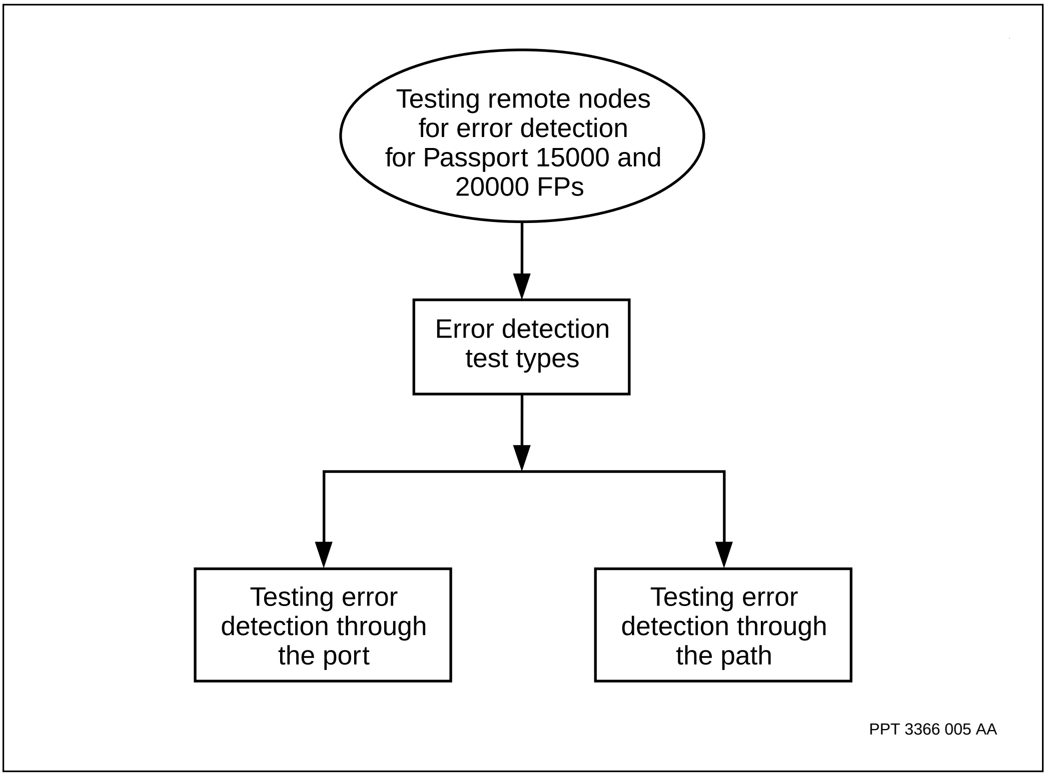
Prerequisites to testing remote nodes for error detection

- The tests are performed by creating an external loopback to a remote node in the network. Passport provisions a customized frame pattern with a bit interleaved parity (BIP) error. The damaged frame is sent to the remote node to verify that the remote node is detecting the error. These tests are not diagnostic. You need to lock the port or channel being tested on the FP before running the BIP error test.
- Regular diagnostic tests should be performed on the remote node if the transmitted BIP errors are not detected.

Testing remote nodes for error detection task flow

This task flow shows you the sequence of procedures you perform to test remote nodes for error detection. To link to any procedure, go to “Task flow navigation” (page 226).

Figure 66
Testing remote nodes for error detection task flow



Task flow navigation

- "Error detection test types" (page 227)
- "Testing error detection through the port" (page 228)
- "Testing error detection through the path" (page 230)

Error detection test types

Passport supports the following error detection tests:

- “Line BIP8 error test” (page 227)
- “Section BIP8 error test” (page 227)
- “Path BIP8 error test” (page 227)
- “Path BIP2 error test” (page 227)

Line BIP8 error test

The line BIP8 error test verifies the remote node detects a BIP8 error (inverted B1 byte) on the SDH line.

Section BIP8 error test

The section BIP8 error test verifies the remote node detects a BIP8 error (inverted B1 byte) on the SDH path.

Path BIP8 error test

The path BIP8 error test verifies the remote node detects a BIP8 error (inverted B3 byte) in the high order path.

Path BIP2 error test

The path BIP2 error test verifies the remote node detects a BIP2 error (bit 1-2 of an inverted V5 byte) in the high order and low order paths.

Testing error detection through the port

Test error detection through the port to ensure that the remote node is able to detect errors through the port.

Prerequisites

- You need to lock the port before running the bit interleaved parity (BIP) error tests. For details concerning the use of the lock command, see 241-5701-050 *Passport 7400, 15000, 20000 Commands*.

Procedure steps

1 Specify the test you want to run:

```
set Lp/<n> <port>/<p> Test type <testtype>
```

2 Specify the duration of the test:

```
set Lp/<n> <port>/<p> Test duration <limit>
```

3 Start the test and verify the start command:

```
start Lp/<n> <port>/<p> Test
```

4 Display and verify the test result statistics at the remote node:

```
display Lp/<n> <port>/<p> <results>
```

5 Verify the stop command before the test timer expires:

```
stop Lp/<n> <port>/<p> Test
```

The system automatically displays the test results if you stop a test or when the test ends.

Variable definitions

Variable	Value
<limit>	specifies the maximum length of time that the test can run, in hundredths of a minute. The default value is 1.00 minutes.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
(Sheet 1 of 2)	

Variable	Value
<results>	is name of the result statistics. Passport provides lineBIP8Alarm or sectionBIP8Alarm based on the test that was run.
<testtype>	is the type of test. The following test types are supported by Passport 15000 and 20000: lineBIP8Error and sectionBIP8Error.
(Sheet 2 of 2)	

Testing error detection through the path

Test error detection through the path to ensure that the remote node is able to detect errors through the path.

Prerequisites

- You need to lock the port or channel before running the bit interleaved parity (BIP) error tests. For details concerning the use of the lock command, see 241-5701-050 *Passport 7400, 15000, 20000 Commands*.
- You can only test the high-order path or low-order path at one time. The test must be run separately for each path.

Procedure steps

1 Specify the test you want to run:

set Lp/<n> <port>/<p> <high_path>/<q> [<low_path>/<r>] Test type <testtype>

2 Specify the duration of the test:

set Lp/<n> <port>/<p> <high_path>/<q> [<low_path>/<r>] Test duration <limit>

3 Start the test and verify the start command:

start Lp/<n> <port>/<p> <high_path>/<q> [<low_path>/<r>] Test

4 Display and verify the test result statistics at the remote node:

display Lp/<n> <port>/<p> <high_path>/<q> [<low_path>/<r>] <results>

5 Verify the stop command before the test timer expires:

stop Lp/<n> <port>/<p> Test

The system automatically displays the test results if you stop a test or when the test ends.

Variable definitions

Variable	Value
<high_path>	is the high order path.
<limit>	specifies the maximum length of time that the test can run, in hundredths of a minute. The default value is 1.00 minutes.
<low_path>	is the low-order path. The low-order path is only set for the pathBIP2Error test when testing the low-order path.
<n>	is the instance number of the logical processor linked to the port.
<p>	is the port number.
<port>	is the port type.
<q>	is the path value.
<r>	is the path value.
<results>	is name of the result statistics. Passport provides pathBIP8Alarm or pathBIP2Alarm based on the test that was run.
<testtype>	is the type of test. The following test types are supported by Passport 15000 and 20000: pathBIP8Error and pathBIP2Error.

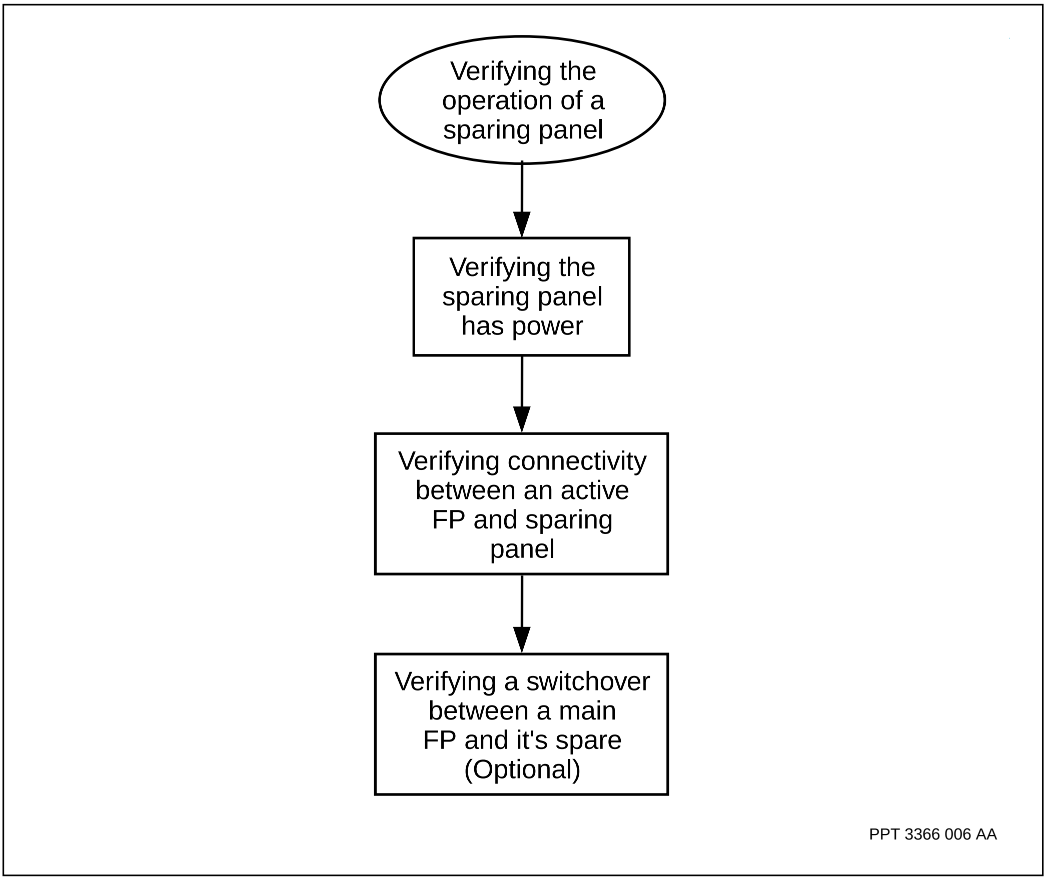
Chapter 11
Verifying the operation of a sparing panel

Verify the operation of a sparing panel for electrical function processors (FPs) after an initial installation, replacement, or upgrade of an FP, sparing panel, or both FP and sparing panel.

Verifying the operation of a sparing panel task flow

This task flow shows you the sequence of procedures you perform to verify the operation of a sparing panel. To link to any procedure, go to “Task flow navigation” (page 234).

Figure 67
Verifying the operation of a sparing panel task flow



Task flow navigation

- “Verifying the sparing panel has power” (page 235)
- “Verifying connectivity between an active FP and sparing panel” (page 236)
- “Verifying a switchover between a main FP and its spare” (page 237)

Verifying the sparing panel has power

Verify the sparing panel has power to confirm that the sparing panel is receiving power. Although traffic can run through the main connection while the sparing panel is unpowered, the sparing panel should be receiving power for an initial installation or replacement of the sparing panel.

Procedure steps

1 Locate the sparing panel.

2 Locate the status LED or LEDs if present on the unit.

If the sparing panel has no status LED of any kind, verify it is receiving power by verifying the throughput of traffic. Skip the rest of this procedure and do “Verifying connectivity between an active FP and sparing panel” (page 236).

3 Check that the LED is lit for either the main or the spare connections.

4 If a sparing panel LED is not lit:

a. Ensure that the sparing panel is cabled between the function processor (FP) and the sparing panel through the Main control port connection for a one-for-one (1:1) sparing panel or n connections for a one-for-n (1:n) sparing panel. With a Passport 15000 or 20000 sparing panel, the control port connections are labelled FP1 to FP6 and Spare FP. For an MSA32 sparing panel, refer to the appropriate section in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

b. Ensure that the DB9 connectors at both ends are fully seated and appropriately fastened in their receptacles.

5 If a LED is still not lit, verify whether a LED is lit on either a main or the spare FP. At least one FP must be powered for the sparing panel to receive power.

6 If an FP LED is not lit, trace back the source of power to the FPs to identify why there is no power.

7 When the source of power is switched on for the FPs, repeat step 3.

Verifying connectivity between an active FP and sparing panel

Verify the connectivity between an active FP and the sparing panel to ensure the throughput of traffic signals between them.

Prerequisites

- Before completing this procedure, ensure that you have done “Verifying the sparing panel has power” (page 235).

Procedure steps

1 Ensure that your Passport system is up and running with traffic.

2 Verify that the active FP or FPs have a solid green status LED. This means each FP is loaded with software and is in-service.

3 In the software, query the status of the attribute *sparingConnection* for each main and spare FP.

```
display -p shelf card/<m> sparingConnection
```

4 Confirm that the status of *sparingConnection* is appropriate for your one-for-one (1:1) or one-for-n (1:n) configuration as described in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Variable definitions

Variable	Value
<m>	is the slot number of the FP.

Verifying a switchover between a main FP and its spare

Verify the switchover between a main FP and its spare to ensure the connectivity between the FP and the sparing panel and the throughput of traffic signals between them.

Prerequisites

- Before verifying the switchover between a main FP and its spare, ensure that you have done “Verifying connectivity between an active FP and sparing panel” (page 236).

Procedure steps

1 Verify that the FPs are configured in software for sparing. Record the number of the logical processor (LP) of the FPs involved in the sparing. Refer to 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*, the section on configuring equipment protection for electrical interfaces.

2 Identify the node name and slot number of each active FP and verify that each still has a solid green status LED.

3 Identify the node name and slot number of the standby FP and verify that it still has a fast flashing green status LED.

4 Switch the activity from a main to the spare FP through the sparing panel by entering the command:

switchover LP/<n>

Note: Performing a switchover can cause a temporary loss traffic. Refer to 241-1501-200 *Passport 15000, 20000 Hardware Description*, the chapter on termination panels, the section on basic functionality and operation of a sparing panel.

5 Observe the status LED of the spare connection on the faceplate of the sparing panel. When the switchover completes, the spare LED lights. This verifies the switchover has occurred successfully.

6 Repeat the procedure “Verifying connectivity between an active FP and sparing panel” (page 236).

7 Make the main FP active again by entering the command:

switchover LP/<n>

Variable definitions

Variable	Value
<n>	is the number of the LP.

Chapter 12
Troubleshooting the Passport 15000 or 20000 fabric card

Troubleshoot the Passport 15000 or 20000 fabric card to verify newly installed shelf hardware or to diagnose problems related to the fabric card.

- “Prerequisites to troubleshooting the Passport 15000 or 20000 fabric card” (page 239)
- “Troubleshooting the Passport 15000 or 20000 fabric card task flow” (page 240)

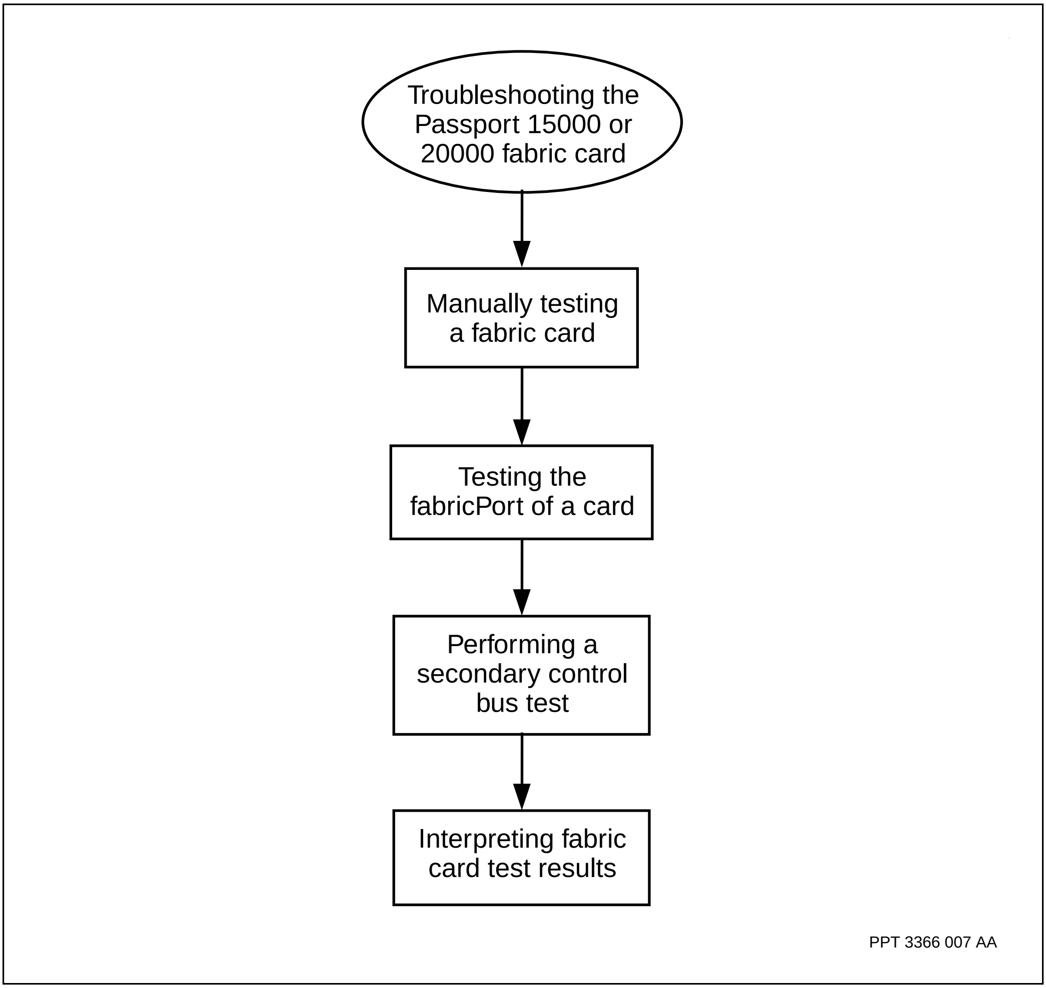
Prerequisites to troubleshooting the Passport 15000 or 20000 fabric card

- See “Supporting information for troubleshooting the Passport 15000 or 20000 fabric card” (page 259) for additional information.

Troubleshooting the Passport 15000 or 20000 fabric card task flow

This task flow shows you the sequence of procedures you perform to troubleshoot the Passport 15000 or 20000 fabric card. To link to any procedure, go to “Task flow navigation” (page 241).

Figure 68
Troubleshooting the Passport 15000 or 20000 fabric card task flow



Task flow navigation

Manually testing a fabric card

Manually test a fabric card to individually verify the operation of each fabric card. When the fabric test type is set to *main*, the fabric enables communication between the processor cards on your node. To test a fabric, you need to lock it, leaving it unable to transport data from processor card to processor card. You need to test each of the two Passport 15000 or 20000 fabrics individually to prevent a node outage. While you are testing one fabric, the other fabric continues to provide service to all processor cards on the node.

Prerequisites

- The commands in this procedure must be performed in operational mode.
- To interpret the results of the test, see “Interpreting fabric card test results” (page 251).

Procedure steps

CAUTION
Risk of service outage on a node
The fabric being tested needs to be locked to run the test but the lock command will fail unless its mate card is verified by the system as being capable of taking over the traffic.

1 Identify the fabric that is to take over traffic as the X or the Y. The X fabric is installed in the upper position of the shelf assembly while the Y is in the lower position of the same shelf.

2 Check the status of the fabric that is to take over the traffic of the fabric being tested. This fabric must be unlocked and enabled, that is, in service with a solid green LED.

`display Shelf backplaneOperatingMode`

Takeover can occur if the response is any of the following:

- *dualFabric*
- *singleFabricX*, provided the fabric that is taking over traffic is X
- *singleFabricY*, provided the fabric that is taking over traffic is Y

- *dualFabricDegraded*, provided you recognize that the diminished capacity of the fabric may prevent the locking and then the takeover

Note: With *dualFabricDegraded* ensure that you lock the correct fabric. Otherwise the FPs that already have one port of the two fabric ports disabled will reset when the remaining port is locked.

3 Lock the fabric to initiate its traffic takeover by the mate fabric and to remove it from service.

`lock Shelf fabricCard/<n>`

4 Set the maximum amount of time that you will allow the test to run.

`set Shelf fabricCard/<n> Test duration <limit_value>`

You cannot change the time limit after the test has started.

5 Start the fabric test:

`start Shelf fabricCard/<n> Test`

The test stops automatically if it detects a failure that prevents subsequent portions of the fabric test from executing. Otherwise, the series of tests continue up to the specified duration.

6 If you want to end the test before the specified duration, enter:

`stop Shelf fabricCard/<n> Test`

Test results are kept by the system up to the point at which the test is stopped.

If the reason for stopping the test is to return the fabric to service, the system may prevent it depending on any fault it found.

7 You can view the results of a test while the fabric test is still in progress or after it has completed.

`display Shelf fabricCard/<n> Test Results`

8 Based on the test results, fix the problem with the fabric or any card that is directly associated with it. After a fix, repeat step 5 and step 7.

If the problem is not fixed, the system may prevent you from unlocking the card.

9 Once the test is complete and the problem is addressed, unlock the fabric:

`unlock shelf fabricCard/<n>`

Note: The fabric can be enabled even if faults are present.

Variable definitions

Variable	Value
<n>	is the instance value of the fabric card you are testing (either X or Y).
<limit_value>	specifies the maximum length of time in 1-minute increments, that the fabric card test will run. The default is 2 minutes, which is sufficient for a basic test. One minute is not enough, and longer than one hour adds no further value to the test results.

Procedure job aid

Figure 69
Manually testing a fabric card component hierarchy

- **EM**
  - **Shelf**
    - **FabricCard**
      - secondaryControlBusStatus
      - secondaryControlBusFabricBustaps
      - secondaryControlBusCardBustaps
      - **Test**
        - Setup
          - duration
          - type
        - Results
          - elapsedTime
          - timeRemaining
          - causeOfTermination
          - testsDone
          - selfTestsResults
          - portTestResults
          - broadcastTestResults
          - pingTests
          - pingTestFailures (pingFailures)
          - numberOfScbPolls
          - scbCardBustapsFailures
          - scbFabricBustapsFailures

PPT 2930 027 AA

Testing a port on a fabric

Test a port on a fabric to determine if any ports disabled. One or more fabric ports can be disabled on a functioning fabric card.

Prerequisites

- If all *fabricPorts* are disabled, the *fabricCard* is removed from service.
- You cannot change the time limit after the test has started.
- See 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms* for the description of alarms 7002 0012 and 7002 0009.

Procedure steps

1 Lock the *fabricPort*.

```
lock shelf Card/<m> fabricPort/<n>
```

2 Set the maximum length for the test.

```
set shelf Card/<m> fabricPort/<n> Test duration
<limit_value>
```

3 Start the *fabricPort* test.

```
start shelf Card/<m> fabricPort/<n> test
```

4 To end the test before the specified duration, stop it.

```
stop shelf Card/<m> fabricPort/<n> test
```

5 Once the test is complete, unlock the *fabricPort*.

```
unlock shelf Card/<m> fabricPort/<n>
```

6 Repeat the test on each other port of the fabric until all ports are tested.

Variable Values

Variable	Value
<limit_value>	specifies the maximum length of time, in 1-minute increments, that the *fabricPort* test will run. The default is 2 minutes. One minute is not enough time, and greater than one hour typically adds no further value.
(Sheet 1 of 2)	

Variable	Value
<m>	is the number of the processor card.
<n>	is the instance value of the fabric port you are testing (either X for the fabric in the upper position in the shelf or Y in the lower position of the same shelf).
(Sheet 2 of 2)	

Performing a secondary control bus test

Perform a secondary control bus test when the fabric-based shelves are no longer able to provide service and an alarm is generated. This can occur either because the SCB is not receiving a clock signal or because at least one operational card cannot access the SCB.

Prerequisites

- The fabric card test type must be set to *scbPoll* before a secondary control bus test can run.
- This test should only be run after the SCB attributes have been examined. If the SCB failure occurred prior to clearing the alarm, do not run the fabric card test again, as the test can result in traffic loss.
- For the specifics related to the SCB alarm 7002 0002, refer to 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.

Procedure steps

1 Examine the results of the SCB attributes prior to clearing the generated alarm:

```
display shelf fabric/x secondaryControlBusStatus
```

```
display shelf fabric/x
secondaryControlBusFabricBustaps
```

```
display shelf fabric/x secondaryControlBusCardBustaps
```

2 Set the SCB test to be run.

```
set shelf fabric/<n> test type scbPoll
```

```
set shelf fabric/<n> test duration <limit_value>
```

```
start shelf fabric/<n> test
```

Depending on the results of the test, if all the available cards report failures, go to the next step. If not all the cards report failures, remove the suspect cards one by one and rerun the secondary control bust test to verify that the problem clears.

3 Run the manual fabric card *main* test again. Prior to running the test again, ensure that the value of the fabric card test is set to *main*:

```
set shelf fabric/<n> test type main
```

If the problems cannot be resolved, there may be major errors with the fabric.

Variable definitions

Variable	Value
<n>	is the instance value of the fabric card you are testing (either X or Y).
<limit_value>	specifies the maximum length of time in 1-minute increments, that the fabric card test will run. The default is 2 minutes, which is sufficient for a basic test. Extending the test longer than one hour adds no further value to the test results.

Procedure job aid

Figure 70
Manually testing a fabric card component hierarchy

- **EM**
  - **Shelf**
    - **FabricCard**
      - secondaryControlBusStatus
      - secondaryControlBusFabricBustaps
      - secondaryControlBusCardBustaps
      - **Test**
        - Setup
          - duration
          - type
        - Results
          - elapsedTime
          - timeRemaining
          - causeOfTermination
          - testsDone
          - selfTestsResults
          - portTestResults
          - broadcastTestResults
          - pingTests
          - pingTestFailures (pingFailures)
          - numberOfScbPolls
          - scbCardBustapsFailures
          - scbFabricBustapsFailures

PPT 2930 027 AA

Interpreting fabric card test results

The table “Fabric card test result attributes and uses” (page 251) describes each of the test result attributes and its possible values.

The table “Interpreting fabric card test results” (page 255) describes the possible results of each fabric card test. For each test, the table suggests a number of remedial actions to correct certain problems. After you perform the remedial action, perform the fabric card test again. See “Manually testing a fabric card” (page 242).

Table 35
Fabric card test result attributes and uses

Attribute	Use
causeOfTermination	Displays the reason the fabric card test ended. The reason can be one of the following: • neverStarted: no one has started the fabric card test • testRunning: the fabric card test is currently running • testTimeExpired: the fabric card test ran for the specified duration • stoppedByOperator: an operator issued a Stop Fabric Card Test command • selfTestFailure: there was a failure during the fabric self-test • portTestFailure: there was a failure during the port test • broadcastFailure: there was a failure during the broadcast test
elapsedTime	Displays the length of time (in minutes) that the fabric test has been running.
timeRemaining	Displays the maximum length of time (in minutes) that the fabric card test will continue to run before stopping.
(Sheet 1 of 4)	

Table 35 (continued)
Fabric card test result attributes and uses

Attribute	Use
testsDone	Displays the tests completed during the fabric card test. The attribute can have the value 0 or one of the following: • selfTest: the fabric card self-test was completed • portTest: the port test was completed • broadcastTest: the broadcast test was completed • pingTest: at least one ping test was completed
selfTestResults	Records the results of the fabric's self test. The result is either OK, failed, or noTest. The fabric test terminates automatically if a failure is detected.
portTestResults	Displays the results of the fabric port test, indexed by the slot numbers of the cards containing the fabric ports involved. Each entry has one of the following values: • +: the port passed its self-test • X: the port failed its self-test • . : there was no test of the port ***Note 1:*** The port test ends automatically as soon as a fabric port fails the test. ***Note 2:*** This attribute is only displayed when the fabric card test type is set to *main*.
(Sheet 2 of 4)	

Table 35 (continued)
Fabric card test result attributes and uses

Attribute	Use
broadcastTestResults	Displays the results of the broadcast test, indexed by the slot numbers of the cards containing the fabric ports involved. Each entry has one of the following values assigned to it: • +: the transmitting fabric port successfully sent a broadcast message to the receiving fabric port • X: the transmitting fabric port did not successfully send a broadcast message to the receiving fabric port • . : there was no test of the associated pair of fabric ports ***Note 1:*** The fabric card test continues automatically if a port fails to respond to the test. ***Note 2:*** This attribute is only displayed when the fabric card test type is set to *main*.
pingTests	Displays the number of ping tests completed for each fabric port, indexed by the slot numbers of cards containing the fabric ports involved. Each test attempts to transmit a single low-priority frame from the transmitting fabric port to the receiving fabric port. ***Note:*** This attribute is only displayed when the fabric card test type is set to *main*.
pingTestFailures	Displays the number of ping test failures, indexed by the slot numbers of the cards containing the fabric ports involved. Each failure represents a single low-priority frame that was not successfully transmitted from the transmitting fabric port to the receiving fabric port. ***Note 1:*** The fabric card test does not terminate automatically if a failure occurs during this test. ***Note 2:*** This attribute is only displayed when the fabric card test type is set to *main*.
numberOfScbPolls	Indicates the number of times the secondary control bus taps are polled since the start of the fabric card test. ***Note:*** This attribute is only displayed when the fabric card test type is set to *scbPoll*.
(Sheet 3 of 4)	

Table 35 (continued)
Fabric card test result attributes and uses

Attribute	Use
scbCardBustapsFailures	Indicates the number of secondary control bus card bus tap failures, indexed by the slot numbers of the cards containing the bus tap involved. The SCB test does not terminate automatically if a failure is detected. ***Note:*** This attribute is only displayed when the fabric card test type is set to *scbPoll*.
scbFabricBustapsFailures	Indicates the number of secondary control bus fabric bus tap failures on the corresponding fabric card. The SCB test does not terminate automatically if a failure is detected. ***Note:*** This attribute is only displayed when the fabric card test type is set to *scbPoll*.
(Sheet 4 of 4)	

Table 36
Interpreting fabric card test results

Test type	Test result	Remedial action
Fabric card self-test	An entry in the *selfTestResults* attribute shows OK. The fabric card passed.	No remedial action is necessary.
	An entry in the *selfTestResults* attribute shows failed. The fabric card failed the self test.	Replace the card. Rerun the test to verify that the problem has been corrected.
	An entry in the *selfTestResults* attribute shows noTest. There was no test of the fabric card on the corresponding card.	The test was never started.
Port self-test	An entry in the *portTestResults* attribute shows a + (plus sign). The port on the corresponding card passed the port self-test.	No remedial action is necessary.
	An entry in the *portTestResults* attribute shows an X. The port on the corresponding card failed the port self-test.	Replace the card. Rerun the test to verify that the problem has been corrected.
	An entry in the *portTestResults* attribute shows a . (dot). There was no test of the port on the corresponding card.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again but no more than a few times.
(Sheet 1 of 4)		

Table 36 (continued)
Interpreting fabric card test results

Test type	Test result	Remedial action
Broadcast test	An entry in the *broadcastTestResults* attribute shows a + (plus sign). A broadcast frame was successfully sent from the transmitting processor card to all processor cards.	No remedial action is necessary.
	An entry in the *broadcastTestResults* attribute shows an X. A broadcast frame was not successfully sent from the transmitting processor card to all processor cards.	Replace the hardware item that is most likely to have failed (see below) and rerun the fabric card test. Repeat until the problem is corrected. The most likely point of failure is the • processor card corresponding to rows or columns containing X but not + (plus sign), in order of decreasing number of Xs • processor card corresponding to rows or columns containing X and + (plus sign), in order of decreasing number of Xs • backplane (contact your Nortel Networks representative because replacing a backplane means replacing a shelf assembly)
	An entry in the *broadcastTestResults* attribute shows a . (dot). The corresponding pair of fabric cards was not tested.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again but no more than a few times.
(Sheet 2 of 4)		

Table 36 (continued)
Interpreting fabric card test results

Test type	Test result	Remedial action
Ping test	An entry in the *pingTestFailures* attribute is 0 and the corresponding entry in the *pingTests* attribute is equal to the largest entry in that table. The transmitting card successfully sent a low-priority frame to the receiving card during each ping test.	No remedial action is necessary.
	An entry in the *pingTestFailures* attribute is greater than 0 and the corresponding entry in the *pingTests* attribute is equal to the largest entry in that table. The transmitting card did not successfully send a low-priority frame to the receiving card during each ping test.	Replace the hardware item that is most likely to have failed (see below) and rerun the fabric card test. Repeat until the problem is corrected. The most likely point of failure is the • processor card corresponding to rows or columns of ping test failures adding to a value greater than 0, in order of decreasing sums • backplane (contact your Nortel Networks representative because replacing a backplane means replacing a shelf assembly)
	An entry in the *pingTests* attribute is smaller than the largest entry. Some of the ping tests did not test the corresponding pair of fabric cards. If a processor card continuously fails to send the same number of pings as other processor cards, that card is faulty.	No remedial action is necessary. If no pings were received, run the test again but no more than a few times.
SCB Poll test	An entry in the *scbCardBustapsFailures* attribute is 0 means that the corresponding SCB port is working fine.	No remedial action is necessary.
(Sheet 3 of 4)		

Table 36 (continued)
Interpreting fabric card test results

Test type	Test result	Remedial action
	An entry in the *scbCardBustapsFailures* attribute is non-zero means that the corresponding SCB port has some problems. If failures are seen on more than one port, it may be due to the fabric clock.	Run a fabric test with the test type set to main. If this does not clear the problem, the cards corresponding to the non-zero value of the *scbCardBustapsFailures* attribute must be removed from the shelf one by one, and another SCB test should be run in order to verify that the problem is cleared and that all *scbCardBustapsFailures* attributes are 0. If there is only one *scbCardBustapsFailures* attribute that is non-zero, replace the card.
	An entry in the *scbFabricBustapsFailures* attribute is non-zero means that the corresponding fabric port failed one or more polls.	Run a fabric test, with the test type set to main, corresponding to the fabric that had the non-zero *scbFabricBustapsFailures* attribute. If the test fails, the fabric card needs to be replaced.
(Sheet 4 of 4)		

Supporting information for troubleshooting the Passport 15000 or 20000 fabric card

Normally, when the system detects a problem with a fabric card or a fabric port on the card, the system automatically tests this hardware, see "Fabric card auto-recovery" (page 261) for more information about this functionality.

You can use the fabric card test to verify newly installed shelf hardware (for example, a newly inserted processor or fabric card), or to diagnose problems related to the fabric card. A fabric card test can be run as part of a regular maintenance program, or to diagnose the cause of a specific fabric-related problem.

When the fabric card test type attribute is set to *main*, the fabric card test ensures that the fabric ports on a specific fabric card are functioning properly at minimal utilization rates, that is, this test verifies the connectivity, not the maximum load. This test involves only fabric ports on operational cards (active and standby cards). If an operational card becomes non-operational or fails to respond during the test, the test drops it from the subsequent testing and progresses to the next card. However, the results of any tests on its fabric port up to that point are kept. The results of this test can help to determine if portions of the fabric card system are faulty. For example, if all the ports fail the test, the fabric is faulty. If one port fails the test, then it usually indicates a problem on the processor card that is connected to that port.

Before testing a fabric card, you must lock it. You can start and stop the fabric card test manually, or you can specify an amount of time for the test (the *duration* attribute). The test stops automatically if it detects a fabric self-test failure, a fabric port self-test failure, or a broadcast test failure. You can view the results of the test by displaying the attributes in the Results group while the test is running or after it is complete.

A *main* type of fabric card test is comprised of several different tests which take place in the following order:

1 Self-test: The fabric card executes its self-test.

2 Port test: Each fabric port ensures that it can connect to the fabric card ports.

3 Broadcast test: Each fabric port ensures that it can receive a broadcast frame over the backplane from every operational card (including itself).

4 Ping test: Each fabric port ensures that it can receive a low-priority non-broadcast frame over the backplane from every operational card (including itself).

The following card types do not support the broadcast portion of the fabric test:

- 2pDS3cAal
- 32pE1Aal
- 4pGe
- 16pOC3PosAtm

The series of tests are initiated on the processor cards in sequence one at a time. Since the test duration varies according to the type of cards, the tests run in parallel until each completes. When a test completes, the result is reported to the CP. The duration of the tests varies slightly according to the type CP.

Once all of the tests are complete, the ping test repeats continuously until the fabric card test ends. This repetition helps to detect transient fabric card faults. The results from the ping test indicate which cards were not responding because they were dropped out of the testing.

When the fabric test type attribute is set to *scbPoll*, the fabric card test ensures that the X and Y fabric bus taps and the function processor bus taps on a corresponding secondary control bus (SCB) are functioning properly. The test can be run without locking the fabric card. This test only involves SCB bus taps on operational cards (active and standby LPs) and the SCB bus taps on the fabric cards. If an operational card becomes non-operational or fails to respond during the test, it is removed from the test. The results of the test can help to determine which portions of the SCB are faulty, if any.

A *scbPoll* type of fabric card test is comprised of several SCB poll queries that run continuously for the duration of the test. At the reception of a poll query, each SCB bus tap ensures that it can receive a frame over the SCB from every operational card, including itself and the fabric cards.

As with a *main* type of fabric card test, the *scbPoll* fabric card test stops automatically after a specified time interval; however, the *main* test also stops automatically if it detects a fabric self-test failure, a fabric port self-test failure, or a broadcast test failure.

For more information on the software of fabric cards, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*. For information on the LED behavior of fabrics, see 241-1501-240 *Passport 15000, 20000 Hardware Installation, Maintenance and Upgrade*. For procedures on performing diagnostic fabric card tests, see “Manually testing a fabric card” (page 242).

Fabric card auto-recovery

In cases where an unlocked fabric card becomes disabled by the system, an auto-recovery process is initiated to recover the disabled fabric card. When a fabric port failure is detected, an auto-recovery of that port is automatically initiated. If all fabric ports are out of service, either by system command or failure to communicate with any processor card, an auto-recovery will occur. With all fabric ports out of service, the fabric is likely to be locked.

> ***Note:*** The fabric auto-recovery cannot occur if the fabric is locked, or while the fabric is in the process of being locked or unlocked.

If, after six minutes, there has been no operator intervention to recover the fabric, the auto-recovery process is activated in an attempt to return the fabric to an enabled state. This auto-recovery includes a fabric self-test and port test. Refer to the table “Fabric card test result attributes and uses” (page 251) for details on each of these tests.

If at least one fabricPort is enabled:

- the shelf is brought to dualFabricDegraded mode
- the operationalState of the card is set to enabled
- the card is activated (returned to service)

When all fabricPorts are enabled:

- the shelf is brought to dualFabric mode
- the operationalState of the fabric card is set to enabled

- the fabric card is activated (returned to service)

If the fabric auto-recovery is unable to recover any of the *fabricPorts*, the fabric remains in a disabled state, and the operator must recover the fabric by manually testing the fabric. Refer to “Manually testing a fabric card” (page 242) for details on this process.

> ***Note:*** A second auto-recovery will not occur if the first test is unsuccessful in enabling any of the fabricPorts.

Chapter 13
Troubleshooting the Passport 7400 bus

Troubleshoot the Passport 7400 bus to verify newly installed shelf hardware (for example, a new processor card), or to diagnose problems related to the bus.

- "Prerequisites to troubleshooting the Passport 7400 bus" (page 263)
- "Troubleshooting the Passport 7400 bus task flow" (page 263)

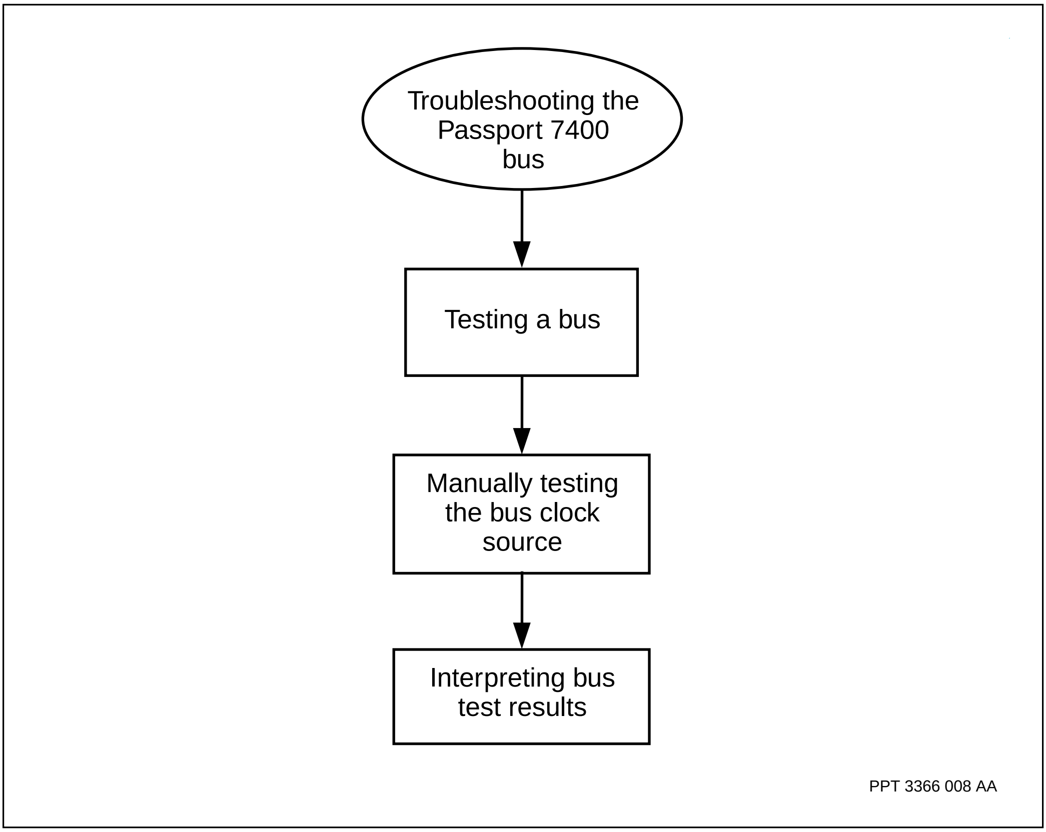
Prerequisites to troubleshooting the Passport 7400 bus

- See the section, "Supporting information for testing a bus" (page 277) and "Supporting information for manually testing the bus clock source" (page 278) for additional information about Passport 7400 bus tests.

Troubleshooting the Passport 7400 bus task flow

This task flow shows you the sequence of procedures you perform to troubleshoot the Passport 7400 bus task flow. To link to any procedure, go to "Task flow navigation" (page 264).

Figure 71
Troubleshooting the Passport 7400 bus task flow



Task flow navigation

- "Testing a bus" (page 265)
- "Manually testing the bus clock source" (page 268)
- "Interpreting bus test results" (page 271)

Testing a bus

Test a bus to ensure that processor cards on your node are able to communicate. To test a bus you must lock it, leaving it unable to transport data from processor card to processor card. You must test each of the two Passport buses individually to prevent a node outage. While you are testing one bus, the other bus continues to provide service to the processor cards on the node.

Prerequisites

- See “Supporting information for testing a bus” (page 277) for additional information.
- Perform the following steps in operational mode.
- For information on the interpreting the results of the bus test, see “Interpreting bus test results” (page 271).

Procedure steps

CAUTION
Testing a bus can result in loss of data
When you lock a bus to test it, total bus capacity decreases by half. Because of the reduced capacity, congestion can occur leading to data loss. Also, if problems occur on the unlocked bus, processor card crashes can occur. To reduce the risk of data loss, do not test a bus during peak periods of traffic.

1 Lock the bus for testing purposes. The other bus must be unlocked and enabled, otherwise the lock command fails.

```
lock Shelf Bus/<b>
```

2 Set the maximum amount of time that you will allow the test to run:

```
set Shelf Bus/<b> Test duration <limit_value>
```

You cannot change the time limit after the test has started.

3 Start the bus test:

```
start Shelf Bus/<b> Test
```

The test stops automatically if it detects a failure that prevents subsequent portions of the bus test from executing. Otherwise, the test continues for the specified duration.

4 If you want to end the test before the specified duration, enter:

`stop Shelf Bus/<b> Test`

5 You can view the results of a test while the bus test is still in progress or after it has completed:

`display Shelf Bus/<b> Test Results`

6 Once the test is complete, unlock the bus:

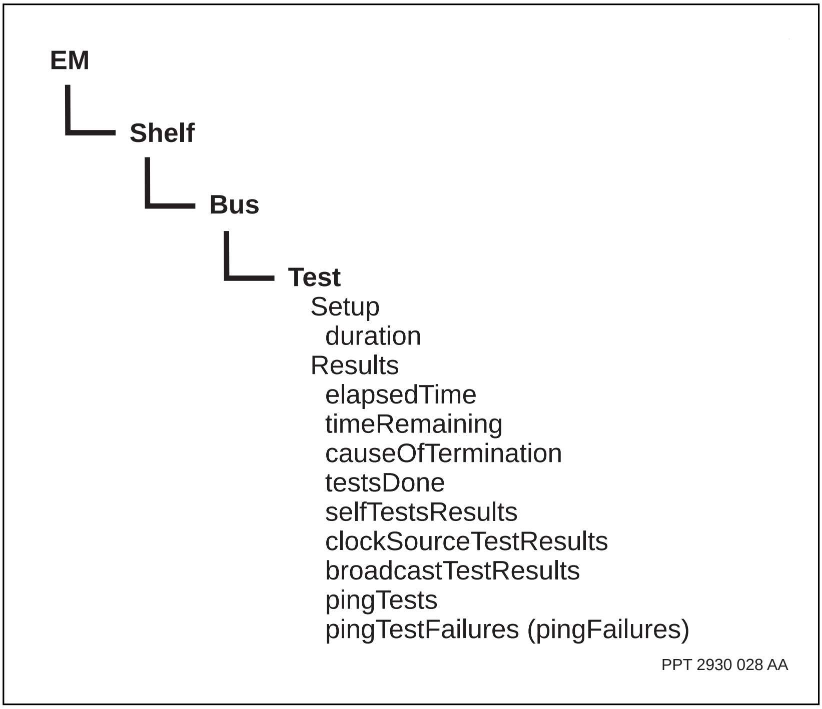
`unlock shelf bus/<b>`

Variable definitions

Variable	Value
<b>	is the instance value of the bus you are testing (either X or Y).
<limit_value>	specifies the maximum length of time, in minutes, that the bus test will run. The default is 1 minute.

Procedure job aid

Figure 72
Testing a bus component hierarchy



Manually testing the bus clock source

Manually test the bus clock source to test the bus clock source at least once a month. This procedure is not necessary if automatic bus clock source testing is enabled.

Prerequisites

- Perform the following procedure in operational.
- Testing the bus clock source can cause minor loss of data. For this reason, run the test when bus utilization is low. Use the following command to determine the percentage of bus utilization:

  `display Shelf Bus/* utilization`

- You cannot manually test the bus clock source when the bus is in single-bus mode.
- See "Supporting information for manually testing the bus clock source" (page 278) for additional information.

Procedure steps

1 Set the type of test to busClock:

`set Shelf Test type busClock`

The default value for the *type* attribute is busClock.

2 Start the test:

`run Shelf Test`

3 Display the test results:

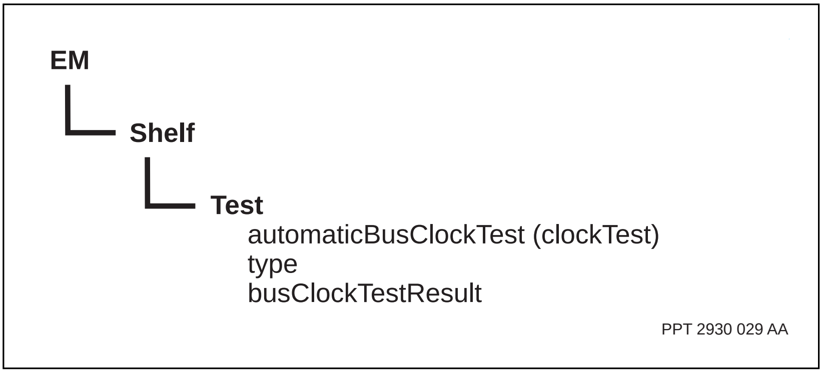
`display Shelf Test busClockTestResult`

There are three possible responses to the bus clock source test:

- pass
- fail
- noTest—This response indicates that the test did not run because the shelf is in single-bus mode.

Procedure job aid

Figure 73
Manually testing the bus clock source component hierarchy



Display bus port on a card

Display *BusTap* attributes to view the OSI, operational, and error attributes that monitor the card interface to the bus.

Prerequisites

- See the 241-5701-060 *Passport 7400, 15000, 20000 Components* for attribute descriptions and values.

Procedure steps

1 Display the OSI, operational, and error attributes:

```
display shelf card/<m> busTap/<n>
```

Variable Values

Variable	Value
<m>	is the number of the processor card.
<n>	is the instance value of the *busTap*, either x or y.

Interpreting bus test results

The table "Bus test result attributes and uses" (page 271) describes each of the test result attributes and its possible values.

The table "Interpreting bus test results" (page 273) describes the possible results of each bus test. For each test, the table suggests a number of remedial actions to correct certain problems. After you perform the remedial action, perform the bus test again. See "Testing a bus" (page 265).

Table 37
Bus test result attributes and uses

Attribute	Use
broadcastTestResults	Displays the results of the broadcast test, indexed by the slot numbers of the cards containing the bus taps involved. Each entry has one of the following values assigned to it: • +: the transmitting bus tap successfully sent a broadcast message to the receiving bus tap • X: the transmitting bus tap did not successfully send a broadcast message to the receiving bus tap • . : there was no test of the associated pair of bus taps ***Note:*** The bus test terminates automatically if there is a failure in the broadcast test.
causeOfTermination	Displays the reason the bus test ended. The reason can be one of • neverStarted: no one has started the bus test • testRunning: the bus test is currently running • testTimeExpired: the bus test ran for the specified duration • stoppedByOperator: an operator issued a Stop Bus Test command • selfTestFailure: there was a failure during the bus tap self-test • clockSourceFailure: there was a failure during the test of the active CP clock source • broadcastFailure: there was a failure during the broadcast test
(Sheet 1 of 3)	

Table 37 (continued)
Bus test result attributes and uses

Attribute	Use
clockSourceTestResults	Displays the results of the clock source test, indexed by the clock source and the slot numbers of the cards containing the bus taps involved. Each entry has one of the following values: • +: the bus tap was able to receive clock signals from the clock source • X: the bus tap was unable to receive clock signals from the clock source • . : there was no test of the bus tap against the clock source ***Note:*** The bus tap self-test terminates automatically if there is a failure involving the active control processor (CP) clock source.
elapsedTime	Displays the length of time (in minutes) that the bus test has been running.
pingTestFailures	Displays the number of ping test failures, indexed by the slot numbers of the cards containing the bus taps involved. Each failure represents a single low-priority frame that did not successfully transmit from the transmitting bus tap to the receiving bus tap. ***Note:*** The bus test does not terminate automatically if a failure occurs during this test.
pingTests	Displays the number of ping tests completed for each bus tap, indexed by the slot numbers of cards containing the bus taps involved. Each test attempts to transmit a single low-priority frame from the transmitting bus tap to the receiving bus tap.
selfTestResults	Displays the results of the bus tap self-test, indexed by the slot numbers of the cards containing the bus taps involved. Each entry has one of the following values: • +: the bus tap passed its self-test • X: the bus tap failed its self-test • . : there was no test of the bus tap ***Note:*** The bus test terminates automatically if there is a failure in the bus tap self-test.
(Sheet 2 of 3)	

Table 37 (continued)
Bus test result attributes and uses

Attribute	Use
testsDone	Displays the tests completed during the bus test. The attribute can have the value 0 or one of the following: • selfTest: The bus tap self-test was completed. • clockSourceTest: The clock source test was completed. • broadcastTest: The broadcast test was completed. • pingTest: At least one ping test was completed.
timeRemaining	Displays the maximum length of time (in minutes) that the bus test will continue to run before stopping.
(Sheet 3 of 3)	

Table 38
Interpreting bus test results

Test type	Test result	Remedial action
Bus tap self-test	An entry in the *selfTestResults* attribute shows a “+”. The bus tap on the corresponding card passed the self-test.	No remedial action is necessary.
	An entry in the *selfTestResults* attribute shows an “X”. The bus tap on the corresponding card failed the self-test. The bus test terminates.	Replace the card. Rerun the test to verify that the problem has been corrected.
	An entry in the *selfTestResults* attribute shows a “.”. There was no test of the bus tap on the corresponding card.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again.
(Sheet 1 of 4)		

Table 38 (continued)
Interpreting bus test results

Test type	Test result	Remedial action
Clock source test	An entry in the *clockSourceTestResults* attribute shows a ”+”. The bus tap on the corresponding card was able to receive clock signals from the specified clock source.	No remedial action is necessary.
	An entry in the *clockSourceTestResults* attribute shows an ”X”. The bus tap on the corresponding card was unable to receive clock signals from the specified clock source. If the clock source being tested is the active control processor clock source the bus test is terminated before going on to the next test.	Replace the hardware item that is most likely to have failed (see below) and rerun the bus test. Repeat until the problem is corrected. The following are the most likely points of failure, in order, if a clock source fails for only one card: • card that failed test • card containing the clock source • backplane The following are the most likely points of failure, in order, if a clock source fails for multiple cards: • card containing the clock source • cards that failed test • backplane The card at the opposite end of the shelf from the active control processor provides the alternate clock source. If the slot is empty, no alternate clock source is available.
	An entry in the *clockSourceTestResults* attribute shows a “.”. There was no test of the bus tap on the corresponding card against the specified clock source.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again.
(Sheet 2 of 4)		

Table 38 (continued)
Interpreting bus test results

Test type	Test result	Remedial action
Broadcast test	An entry in the *broadcastTestResults* attribute shows a “+”. A broadcast frame was successfully sent from the transmitting bus tap to the receiving bus tap.	No remedial action is necessary.
	An entry in the *broadcastTestResults* attribute shows an “X”. A broadcast frame was not successfully sent from the transmitting bus tap to the receiving bus tap. The bus test terminates.	Replace the hardware item that is most likely to have failed (see below) and rerun the bus test. Repeat until the problem is corrected. The most likely point of failure is the • cards corresponding to rows or columns containing “X” but not “+”, in order of decreasing number of “X”s • cards corresponding to rows or columns containing “X” and “+”, in order of decreasing number of “X”s • backplane
	An entry in the *broadcastTestResults* attribute shows a “.”. The corresponding pair of bus taps was not tested.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again.
(Sheet 3 of 4)		

Table 38 (continued)
Interpreting bus test results

Test type	Test result	Remedial action
Ping test	An entry in the *pingTestFailures* attribute is 0 and the corresponding entry in the *pingTests* attribute is equal to the largest entry in that table. The transmitting bus tap successfully sent a low-priority frame to the receiving bus tap during each ping test.	No remedial action is necessary.
	An entry in the *pingTestFailures* attribute is greater than 0 and the corresponding entry in the *pingTests* attribute is equal to the largest entry in that table. The transmitting bus tap did not successfully send a low-priority frame to the receiving bus tap during each ping test.	Replace the hardware item that is most likely to have failed (see below) and rerun the bus test. Repeat until the problem is corrected. The most likely point of failure is the • cards corresponding to rows or columns of ping test failures adding to a value greater than 0, in order of decreasing sums • backplane
	An entry in the *pingTests* attribute is smaller than the largest entry. Some of the ping tests did not test the corresponding pair of bus taps.	If the card is not associated with an LP, no action is required. If the card is associated with an LP, run the test again.
(Sheet 4 of 4)		

Supporting information for testing a bus

The bus test ensures that the bus taps on a specific bus are functioning properly at minimal utilization rates. This test involves only bus taps on operational cards (active and standby LPs). If an operational card becomes nonoperational or fails to respond during the test, the test drops it and does not allow it to rejoin. However, the results of any tests on its bus tap up to that point are kept. The results of the test can help to determine if portions of the bus system are faulty. The figure “Testing a bus component hierarchy” (page 267) illustrates the attributes for setting up and viewing the results of a bus test.

Before testing a bus, you must lock it. You can start and stop the bus test manually, or you can specify an amount of time for the test (the *duration* attribute). The test stops automatically if it detects a bus tap self-test failure, an active CP clock source test failure, or a broadcast test failure. You can view the results of the test by displaying the attributes in the Results group while the test is running or after it is complete.

The complete bus test has several tests which take place in the following order:

1. Bus tap self-test: Each bus tap executes its self-test.
2. Clock source test: Each bus tap ensures that it can receive clock signals from the active CP clock source and the alternate clock source (if present).
3. Broadcast test: Each bus tap ensures that it can receive a broadcast frame over the backplane from every operational card (including itself).
4. Ping test: Each bus tap ensures that it can receive a low-priority non-broadcast frame over the backplane from every operational card (including itself).

Once all of the tests are complete, the ping test repeats continuously until the bus test ends. This repetition helps to detect transient bus faults.

For more information on the buses, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Supporting information for manually testing the bus clock source

You can configure Passport to automatically test the bus clock sources. By default this automatic test is disabled (automaticBusClockTest set to disabled) since the test can cause minor data loss on the bus. If you can tolerate this possible loss, you can enable automatic bus clock source testing. If you cannot, leave it disabled and perform manual bus clock source tests during scheduled service periods. Nortel Networks recommends that you perform a manual bus clock source test at least once a month.

With automatic testing enabled, Passport tests the bus clock source at the following times:

- after a change of state in the logical processor associated with a clock source
- after there is a report of clock signal failure or recovery in the set of operational cards

For more information on bus clock sources, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Chapter 14
Troubleshooting the file system

Troubleshoot the file system to correct problems related to either the file system software or to the disk subsystem on the control processor.

- "Prerequisites to troubleshooting the file system" (page 279)
- "Troubleshoot the file system task flow" (page 279)

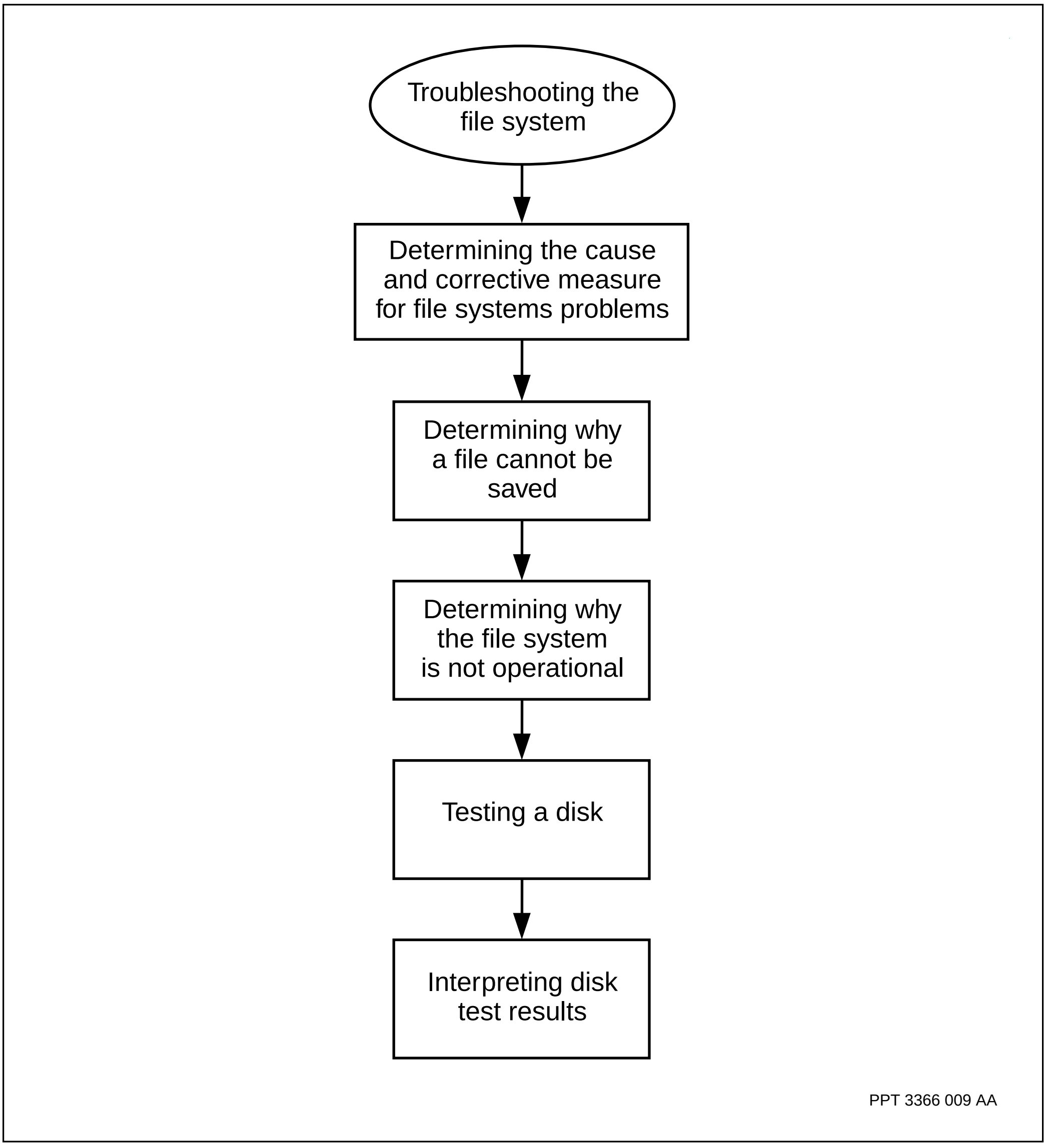
Prerequisites to troubleshooting the file system

- See "Determining the cause and corrective measure for file system problems" (page 282) for information about probable causes and corrective actions for troubleshooting the file system.
- See the section on the Passport file system in the 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Troubleshoot the file system task flow

This task flow shows you the sequence of procedures you perform to troubleshoot the file system. To link to any procedure, go to "Task flow navigation" (page 281).

Figure 74
Troubleshooting the file system task flow



Task flow navigation

Determining the cause and corrective measure for file system problems

Determine the cause and corrective measure for file system problems to identify the appropriate corrective measure for the file system error. See the table "Troubleshooting file system problems" (page 282) for details on how to troubleshoot the file system.

Table 39
Troubleshooting file system problems

Symptom	Probable causes	Corrective measures
File system not operational	File system locked	Issue unlock Fs command.
	All disks failed	Replace the control processors. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
Cannot save to disk	File system locked	Issue the unlock Fs command.
	Disks are full	Remove unnecessary files from the disk. To remove unnecessary provisioning files, issue the tidy Prov command. To remove unnecessary spooling files use the Management Data Provider, or issue the remove Fs command. To remove unnecessary software files, see 241-5701-270 *Passport 7400, 15000, 20000 Software Installation Guide*.

Determining why a file cannot be saved

Determine why a file cannot be saved to know if the cause is a result of a failure in the functioning of the file system or if the file system is full.

Prerequisites

- Perform this procedure in operational mode.

Procedure steps

1 Determine the OSI states for the file system:

`display Fs OsiState`

If adminState is unlocked, operationalState is enabled, and usageState is active, the file system is functioning. Exit this procedure.

If any of the OSI state attributes for the file system have values other than those shown above, the file system is not available. See the procedure “Determining why the file system is not operational” (page 284) to continue through troubleshooting analysis.

2 Determine the available free-space on the file system:

`display Fs freeSpace`

If the available free-space is less than the size of the file to be saved, remove any unnecessary files from the disk. To remove unnecessary provisioning files, issue the tidy Prov command. To remove unnecessary spooling files use the Management Data Provider, or issue the remove Fs command. To remove unnecessary software files, see 241-5701-270 *Passport 7400, 15000, 20000 Software Installation Guide*.

Determining why the file system is not operational

Determine why the file system is not operation to restore the failed system.

Prerequisites

- Perform this procedure in operational mode.

Procedure steps

1 Determine the OSI states for the file system:

`display Fs OsiState`

If adminState is unlocked, operationalState is enabled, and usageState is active, the file system is functioning. Exit this procedure.

If adminState is locked, consult with the operator who took the file system out of service to verify that the file system can now be unlocked and then issue the unlock Fs command. Exit this procedure.

If operationalState is disabled, it is likely that all disks have failed. Go to step 2.

2 Lock and unlock the failed file system:

`lock Fs`

`unlock Fs`

By locking and then immediately unlocking the failed file system, you can sometimes clear a software related problem.

3 Determine the OSI states for the disks:

`display Fs Disk/* OsiState`

If operationalState is disabled for a given disk, that disk has failed.

4 Lock and unlock the failed disk:

`lock Fs Disk/<n>`

`unlock Fs Disk/<n>`

By locking and then immediately unlocking the failed disk, you can sometimes clear a software related problem.

Variable definitions

Variable	Value
<n>	is the number of the failed disk. The disk number corresponds to the slot number of the control processor holding the disk.

Testing a disk

Test a disk to verify the integrity of the disk. Test a disk only when you suspect a fault in the disk hardware.

Prerequisites

- Perform this procedure in operational mode.
- Only test the standby disk on a dual-disk node. If the disk you want to test is currently active, switch control between the active and standby control processors. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.
- See “Supporting information for testing a disk” (page 291) for additional information.

Procedure steps

CAUTION
Risk of operational data records loss
Performing a disk test can cause a loss of operational data. When you lock a disk on a single-CP node, Passport cannot spool operational data records to the disk.

CAUTION
Risk of data loss
Never initiate a surface analysis test on a single-disk system. The test erases all data on the disk and reformats the disk.

1 Set the test type:

```
set Fs Disk/<n> Test type <type>
```

2 If you are working on a single-disk node, lock the file system:

```
lock Fs
```

3 Lock the disk:

```
lock Fs Disk/<n>
```

4 Start the test:

start Fs Disk/<n> Test

5 If you want to stop the test before it is complete, enter

stop Fs Disk/<n> Test

Note: The test does not always stop immediately. The test completes its current cycle before ending.

6 Unlock the disk:

unlock Fs Disk/<n>

7 If you previously locked the file system, unlock it:

unlock Fs

If you performed a surface analysis test, proceed with step 8. If you are doing any other disk tests, proceed to step 10.

8 If you performed a surface analysis test, reset the control processor:

reset Shelf Card/<m>

The standby control processor (CP) attempts to load from its disk four times before it initiates a crossload from the active CP.

9 When the standby CP comes up, use the sync command to restore file system synchronization:

sync Fs

10 Display the disk test results:

display Fs Disk/<n> Test Results

See "Interpreting disk test results" (page 289) for information on the values of the *results* attribute.

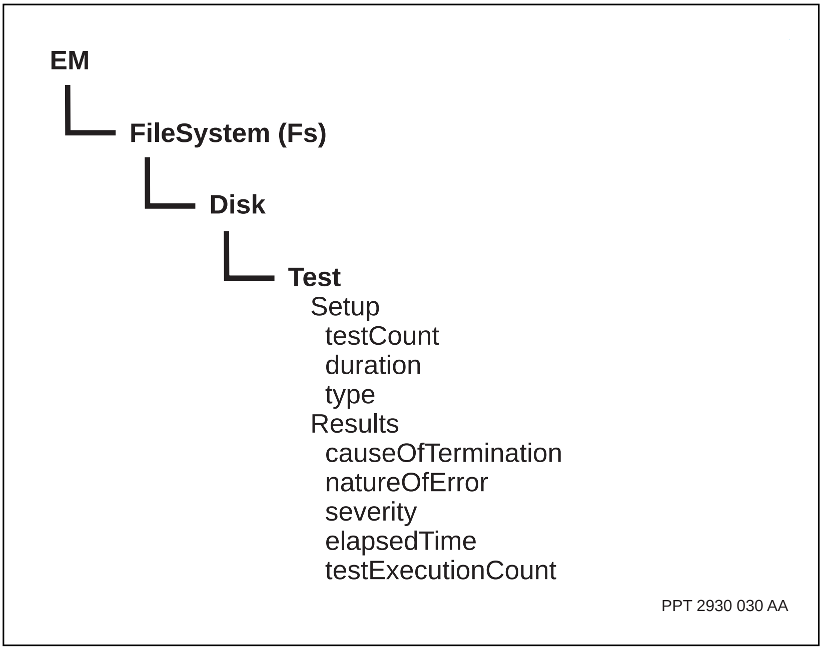
11 If the previous steps have failed to restore the disk, replace the control processor that holds the failed disk. See 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Variable definitions

Variable	Value
<m>	is the number of the control processor containing the disk you tested.
<n>	is the number of the disk to be tested. The disk number corresponds to the slot number of the control processor that holds the disk.
<type>	is one of diskRead, flakyBitDetection, filesystemCheck, or surfaceAnalysis.

Procedure job aid

Figure 75
testing a disk component hierarchy



Interpreting disk test results

The table “Disk test results” (page 289) describes the possible results of the disk tests.

Table 40
Disk test results

Attribute	Use
causeOfTermination	Displays the reason the disk test ended. The reason can be one of the following: • testCountReached: the test ran the specified number of times in the attribute *testCount* and ended normally • error: an error terminated the test. The error is described in the *natureOfError* attribute • neverStarted: the disk test has not started • stoppedByOperator: an operator issued a Stop Shelf Disk Test command • testTimeExpired: the duration of the test expired • testRunning: the test is still running • unknown: the test terminated for unknown reasons • internalError: an internal error terminated the test
elapsedTime	Displays the elapsed time (in minutes) since the test started.
natureOfError	Describes the type of the error found by a test. The type of error can be one of the following: • logical: a filesystem check test followed by a synchronization can fix the error • media: there is a suspected fault in the disk hardware • failedToComplete: the test terminated
results	Displays all results associated with the attributes in this table.
(Sheet 1 of 2)	

Table 40 (continued)
Disk test results

Attribute	Use
severity	Displays the severity of the error found by the test. The severity can be one of the following: • no lost data • lost data • hardware problem
testExecutionCount	Displays the number of times the test ran.
(Sheet 2 of 2)	

Supporting information for testing a disk

Disk tests verify the integrity of the disk. Test a disk only when you suspect a fault in the disk hardware. Note that you cannot test the disk on the active control processor.

The disk tests cannot tolerate any interruptions from normal disk operations, so you must lock the disk before testing it. A locked disk cannot perform normal disk operations.

There are four types of disk tests:

- disk read test: reads every sector on the disk once, marking any bad sectors that it finds. Once the test has marked a sector as bad, the file system does not use that sector. The approximate test duration is four minutes. If the test reveals an error, perform the file system check test.
- flaky bit detection test: reads every sector on the disk twice and compares the two read results, searching for intermittent errors.The approximate test duration is eight minutes. If the test reveals an error, perform the file system check test.
- File system check test: performs a file system sanity check, frees lost clusters, and attempts to correct bad sectors. This test takes a few seconds. You cannot perform this test on the active disk.

  You must run the file system check test if either the disk read test or flaky bit detection test indicate errors.

- Surface analysis test: writes a pattern to the disk and reads back the pattern to determine the condition of the magnetic surface of the disk. This test destroys the contents of the disk. Only use this test if all other disk tests have failed to reveal the error. This test takes about 16 minutes.

For more information about the file system disk and how to display information about the file system, see the 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Chapter 15
Troubleshooting the data collection system

Troubleshoot the data collection system to identify the cause of the problem with the data collection. Problems with the data collection system are usually related to device capacity.

The table “Troubleshooting problems with the data collection system” (page 293) details how to troubleshoot the data collection system.

Table 41
Troubleshooting problems with the data collection system

Symptom	Probable causes	Corrective measures
A network management interface or the spooler is not receiving the data collection information (alarm, SCN, log, and debug data) it requested.	The control processor’s message block usage is close to capacity, probably due to routing table updates.	At least one network management interface or the spooler will be receiving all of the data collection information. Check all of the network management interfaces in the network, or the spooling files on the disk, to locate the information.

Chapter 16
OSI states

The Passport node uses component state definitions according to the OSI standards. Components that are always up and never change state do not require any defined component state variables.

A component has three high-level state variables: an operational state, a usage state, and an administrative state. These states are the primary factors affecting the management state of a component and are described in detail in 241-5701-500 *Passport 6400, 7400, 15000, 20000 Alarms*.

See the following sections for information on the state variables of particular components:

Data collection system component states

The table “Spooler component state combination” (page 296) describes the component state combinations of the *Spooler* component.

Table 42
Spooler component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	This combination occurs when the spooler is unable to spool due to some file system error. This combination can also occur when spooling is turned off.
Unlocked, Enabled, Idle	This combination typically occurs when the spooling is turned off. It can also occur when all the conditions for spooling have been met (file system OK, administratively allowed to spool) but the spooler is not yet completely initialized (file not opened yet, not registered with the collector, and so on). For the most part, the state represented by this combination is transient.
Unlocked, Enabled, Active	This combination occurs when the spooler has a spooling file open and is registered with the collector to receive records. The spooler may or may not be spooling a record, but it is ready to spool a record.
Locked, Disabled, Idle	This combination occurs when the spooler is administratively prohibited from spooling and has also detected an outstanding file system error. This combination can also occur when spooling is turned off.
Locked, Enabled, Idle	This combination occurs when the spooler is administratively prohibited from spooling but otherwise would be ready to try and open a file and register for the data.

File system component states

The following tables describe the component state combinations for components of the file system. The table “FileSystem component state combination” (page 297) describes the component state combinations for the FileSystem component. The table “Disk component state combination” (page 297) describes the component state combinations for the *Disk* component. The table “Disk Test component state combination” (page 298) describes the component state combinations for the *Disk Test* component.

Table 43
FileSystem component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Active	The file system is in normal operating state.
Unlocked, Disabled, Idle	The file system is not available due to internal problems.
Locked, Disabled, Idle	The file system is not available and is also locked.
Locked, Enabled, Idle	The file system is capable of providing service but is manually locked.
Shutting down, Enabled, Active	The file system is performing some tasks. The file system will enter the locked state as soon as the task is complete.

Table 44
Disk component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Active	The disk is in normal operating state.
Unlocked, Disabled, Idle	The disk is not available due to internal problems.
Locked, Disabled, Idle	The disk is not available and is also locked.
Locked, Enabled, Idle	The disk is capable of providing service but is manually locked.
Shutting down, Enabled, Active	An operator has issued a lock command while the disk is performing a certain task. The disk will enter the locked state as soon as the task is complete.

Table 45
Disk Test component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Idle	The test can run, but is not currently running.
Unlocked, Enabled, Active	The test is running.
Unlocked, Disabled, Idle	The test cannot run because the corresponding disk is not locked.

Network management interface system component states

All NMIS managers have the same OSI state combinations. In the table below, the term manager generically refers to any of FTP, local, FMIP, or telnet.

Table 46
FTP, local, FMIP, or telnet manager component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Idle	The manager component is operable, but currently not in use. A manager component can be ready for service, but if there is no connection between the interface and an external device, then the manager component remains in the idle state.
Unlocked, Enabled, Active	The manager component enters the active state when there is one or more connections to an external device but fewer than the maximum number of connections.
Unlocked, Enabled, Busy	The manager component enters this combination when the manager reaches it maximum number of sessions.
Shutting down, Enabled, Active	The manager cannot accept any new connection establishment requests. When all existing user sessions clear, the manager moves to the locked administrative state.
Locked, Enabled, Idle.	The manager cannot accept any new connection establishment requests. There are currently no connections between the interface and an external device.

Port management system component states

The following tables describe the component state combinations for components of the port management system.

- The table “Port Channel component state combination” (page 299) describes the component state combinations for the *Channel* component.
- The table “Port Test component state combination” (page 300) describes the component state combinations for the port *Test* component.
- The table “Passport 7400 series Aps component state combination” (page 301) describes the component state combinations for the *AutomaticProtectionSwitching* (*Aps*) component for Passport 7400 series switches.
- The table “Passport 15000 and 20000 Laps component state combination” (page 301) describes the component state combinations for the *LineAutomaticProtectionSwitching* (*Laps*) component for Passport 15000 and 20000 switches.
- The table “OamEthernet port state combination” (page 302) describes the component state combinations for the *OamEthernet* component.

See also 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference* for descriptions of the state combinations for ports of specific FPs.

Table 47
Port Channel component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	External factors render the *Channel* component inoperable (for example, total BPV error threshold reached).
Unlocked, Enabled, Idle	Not in use. The *Channel* component is being provisioned or waiting for binding.
Unlocked, Enabled, Busy	The *Channel* component is in use. The *Channel* component can only service one user at a time.
(Sheet 1 of 2)	

Table 47 (continued)
Port Channel component state combination

Combination (Administrative, Operational, Usage)	Details
Shutting Down, Enabled, Busy	The operator issued a lock command while the *Channel* component was in use. The *Channel* component is in the process of terminating the user so that it can go into a locked administrative state. An unlock command brings the component into an unlocked administrative state.
Locked, Enabled, Idle	A lock command is in effect. The *Channel* component is otherwise ready to service a user.
Locked, Disabled, Idle	A hardware test failed and the *Channel* component is in the locked administrative state.
Note: On a 4-port DS3 channelized frame relay FP, provisioning the timeslot of the associated frame interface to the value of none and not locking the *Chan* component result in the OSI state of Unlocked, Enabled, Idle.	
(Sheet 2 of 2)	

Table 48
Port Test component state combination

Combination (Administrative, Operational, Usage)	Details
Locked, Disabled, Idle	The hardware component is locked. No resource is available to the *Test* component. Start test requests will be rejected.
Locked, Enabled, Idle	The hardware component is locked. A port and line test can be performed.
Unlocked, Enabled, Active	A start command has been issued, the Test process is being created.
Unlocked, Enabled, Busy	The *Test* component is in use.
Shutting Down, Enabled, Busy	An operator issued a stop command while the *Test* component was in use. The *Test* component is in the process of terminating so that it can go into a locked administrative state.

Table 49
Passport 7400 series Aps component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The *Aps* component is inoperable due to both the working and protection lines being disabled.
Unlocked, Enabled, Idle	The *Aps* component is not in use. The *Aps* component is waiting for binding to an application component.
Unlocked, Enabled, Busy	The *Aps* component is in use. The *Aps* component can service only one user at a time.
Shutting Down, Enabled, Busy	A lock operator command is in effect. The *Aps* component is waiting for a bound application to become suspended.
Locked, Enabled, Idle	The *Aps* component is running in test mode.
Locked, Disabled, Idle	A lock operator command is in effect and the component is in one of the following conditions: • left offline (availabilityStatus: offline) • if running in test mode (availabilityStatus: inTest), the *Aps* component is inoperable due to both the working and the protection lines being disabled

Table 50
Passport 15000 and 20000 Laps component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The *Laps* component is inoperable due to both the working and protection lines being disabled.
Unlocked, Enabled, Idle	The *Laps* component is not in use. The *Laps* component is waiting for binding to an application component.
Unlocked, Enabled, Busy	The *Laps* component is in use. The *Laps* component can service only one user at a time.
Shutting Down, Enabled, Busy	A lock operator command is in effect. The *Laps* component is waiting for a bound application to become suspended.
(Sheet 1 of 2)	

Table 50 (continued)
Passport 15000 and 20000 Laps component state combination

Combination (Administrative, Operational, Usage)	Details
Locked, Enabled, Idle	The *Laps* component is running in test mode.
Locked, Disabled, Idle	A lock operator command is in effect and the component is in one of the following conditions: • left offline (availabilityStatus: offline) • if running in test mode (availabilityStatus: inTest), the *Laps* component is inoperable due to both the working and the protection lines being disabled
(Sheet 2 of 2)	

Table 51
OamEthernet port state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The *Lp/0 oamEthernet/0* component is disabled because of broken hardware or a faulty Ethernet connection to the port.
Unlocked, Enabled, Idle	The component is not in use. It is waiting for the LAN application component to bind to it.
Unlocked, Enabled, Active	The component is in use.
Shutting Down, Enabled, Active	The server component is going from the unlocked state to the locked state.
Locked, Disabled, Idle	A lock command is in effect. The component can be placed in the test mode.
Locked, Enabled, Idle	A lock command is in effect. A hardware test failed.

Framer component states

The table “Control and function processor Framer component state combination” (page 303) describes the component state combinations of the *Framer* component.

Table 52
Control and function processor Framer component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	A component that the *Framer* component depends on has failed. A likely cause is that the port component (for example, a *V35* component) is locked for testing. External factors render the *Framer* component inoperable. Correct the line problem.
Unlocked, Enabled, Idle	The component is not in use.
Unlocked, Enabled, Busy	The *Framer* component is in use. The *Framer* component services only one user (an application component) at a time.
Note: On a 4-port DS3 channelized frame relay FP, provisioning the timeslot of the associated frame interface to the value of none and not locking the application and channel result in the OSI state of Unlocked, Enabled, Idle.	

Processor card component states

The following tables describe the component state combinations for components related to processor cards. The table “Card component state combination” (page 303) describes the component state combinations for the *Card* component. The table “LogicalProcessor component state combination” (page 304) describes the component state combinations for the *LogicalProcessor (Lp)* component. The table “Card test component state combination” (page 305) describes the component state combinations for the *Shelf Card Test* component.

Table 53
Card component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The card is not ready for an LP assignment.
Unlocked, Enabled, Idle	The card is ready for an LP assignment, but has not received one.
(Sheet 1 of 2)	

Table 53 (continued)
Card component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Active	The card is running an LP.
Shutting down, Enabled, Active	The card is running an LP, but the card will lock as soon as the LP stops running.
Locked, Enabled, Idle	The lock operator command is preventing an LP assignment for the card.
Locked, Disabled, Idle	The lock operator command is preventing an LP assignment for the card. However, the card is not ready for an LP assignment.
(Sheet 2 of 2)	

Table 54
LogicalProcessor component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The LP is not available for service.
Unlocked, Enabled, Active	The active instance of the LP is running.
Shutting down, Enabled, Active	The active instance of the LP is running, but will lock as soon as it stops running.
Locked, Disabled, Idle	The lock operator command prevents the assignment of the LP to a processor card.

Table 55
Card test component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The operator cannot perform a card test because: • the target card of the card test is non-operational • the target card of the card test is identical to the source card
Unlocked, Enabled, Idle	A card test is not in progress but an operator request can start one.
Unlocked, Enabled, Busy	A card test is in progress.

Fabric card component states for Passport 15000 and 20000

The following tables describe the component state combinations for components related to the fabric card:

- “Fabric card component state combination” (page 305) for the *FabricCard* component
- “Fabric card test component state combination” (page 306) for the *Test* subcomponent of the *FabricCard* component
- “Fabric port component state combination” (page 307) for the *FabricPort* subcomponent of the *Shelf Card* component

Table 56
Fabric card component state combination

Combination (Administrative, Operational, Usage)	Availability Status	Details
Unlocked, Enabled, Active	(empty)	The component is in service.
Unlocked, Disabled, Idle	InTest	The component is not in service because the operator or the system is testing it.
(Sheet 1 of 2)		

Table 56 (continued)
Fabric card component state combination

Combination (Administrative, Operational, Usage)	Availability Status	Details
	failed	The component is not in service because at least one failure condition was detected.
	depend	The component is not in service because it is dependent on another component.
	notInstalled	The component is not in service because the hardware was removed.
Locked, Disabled, Idle	InTest	The component is not in service because the operator or the system is testing it.
	failed	The component was locked by the operator and at least one failure condition was detected.
	depend	The component was locked by the operator and is dependent on another component.
	notInstalled	The component was locked by the operator and the hardware was removed.
Locked, Enabled, Idle	(empty)	This combination is not possible.
(Sheet 2 of 2)		

Table 57
Fabric card test component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	A fabric card test cannot start because of an error.
Unlocked, Enabled, Idle	An operator request can start the fabric card test.
Unlocked, Enabled, Busy	A fabric card test is in progress.

Table 58
Fabric port component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The fabric port is not operational for one of the following reasons: • the fabric port failed its self-test • the fabric port is unable to receive clock signals from the fabric • the fabric port has detected too many parity errors on the fabric card OR The fabric port is operational but is not communicating with other operational cards because the fabric is disabled or locked. The fabric port’s availability status is *dependency*.
Unlocked, Enabled, Active	The fabric port is operational and is communicating with other operational cards.

Bus component states for Passport 7400

The following tables describe the component state combinations for components related to the bus. The table “Bus component state combination” (page 308) describes the component state combinations for the *Bus* component. The table “BusTest component state combination” (page 308) describes the component state combinations for the *Test* subcomponent of the Bus component. The table “BusTap component state combination” (page 309) describes the component state combinations for the *BusTap* subcomponent of the *Shelf Card* component.

Table 59
Bus component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Enabled, Active	The bus is in service.
Unlocked, Disabled, Idle	The bus is not in service because at least one operational card is unable to access the bus. Its availability status is dependency.
Locked, Enabled, Idle	The bus is not in service because the network administration has locked it.
Locked, Disabled, Idle	The bus is not in service because the network administration has locked it and at least one operational card is unable to access the bus. Its availability status is In Test if a bus test is in progress. Otherwise, its availability status is Dependency.

Table 60
BusTest component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	A bus test cannot start because of an error.
Unlocked, Enabled, Idle	An operator request can start the bus test.
Unlocked, Enabled, Busy	A bus test is in progress.

Table 61
BusTap component state combination

Combination (Administrative, Operational, Usage)	Details
Unlocked, Disabled, Idle	The bus tap is non-operational for one of the following reasons: • the bus tap failed its self-test • the bus tap is unable to receive clock signals from the bus • the bus tap has detected too many parity errors on the bus OR The bus tap is operational but is not communicating with other operational cards because the bus is disabled or locked. The bus tap’s availability status is dependency.
Unlocked, Enabled, Active	The bus tap is operational and is communicating with other operational cards.

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