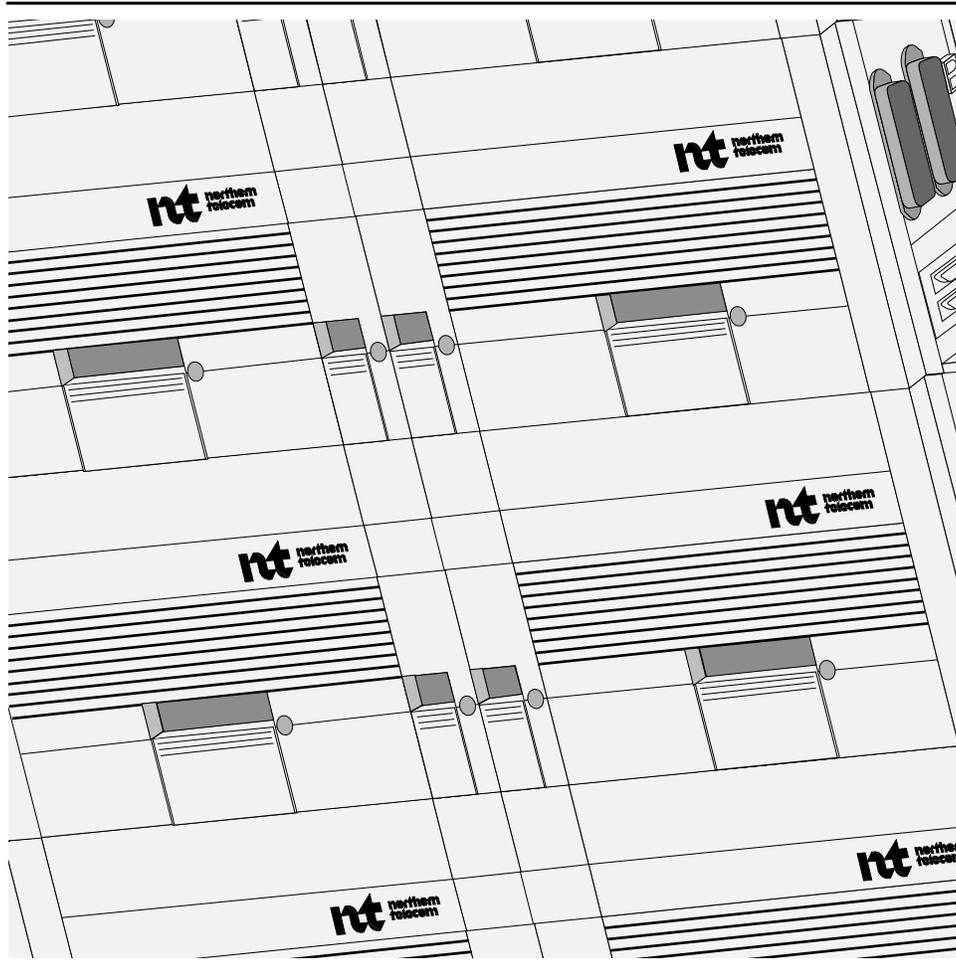**NT4K00LA**        **323-3001-311**

SONET Products

# AccessNode

## Protection Switching Procedures

Issue 2.0   June 1999



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# AccessNode

## Protection Switching Procedures

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# Contents

# About this document

This document contains procedures for personnel responsible for the following provisioning and operating tasks:

- manually provisioning and deprovisioning equipment
- provisioning protection parameters
- displaying protection status and summary screens
- operating and releasing protection switching
- operating and releasing lockouts
- performing timing reference switching
- scheduling and running the exerciser

You can use a graphical terminal for the OPC procedures in this document (even though the procedures are based on a character-mode terminal). If you use a graphical terminal, you must substitute the graphical equivalent of the character-mode keystrokes used in the procedures. See the Graphical Reference card that is provided in the sleeve of this volume.

For additional information on commands, parameters, and response conventions used in OPC procedures and NEUI procedures, see *OPC User Interface Description*, 323-3001-301, and *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

## When to use this document

This document is written for the current release of AccessNode products.

# References in this document

This document refers to the following documents in the AccessNode Northern Telecom Publication (NTP) library.

**Engineering, Configuration, and Ordering Guide, Volume 1**

- *Mapper Layouts Planning Guide*, 323-3001-154

**Commissioning and Testing, Volume 3**

**Operations, Administration, and Provisioning, Volume 4A**

- *Network Element User Interface Description*, 323-3001-300

- *OPC User Interface Description*, 323-3001-301

- *System Administration Procedures*, 323-3001-302

**Maintenance, Volume 5B**

- *Log Report Manual*, 323-3001-840

# Overview of protection switching

This document contains procedures for protection switching at the network element (NE) and the operations controller (OPC). It includes required procedures and procedures that you will perform occasionally.

> *Note:* For information on switching activity for Universal Edge 9000 (UE9000) shelves, refer to the *UE9000 Voice OAM&P User Guide*.

The tables below list the required procedures according to the facility to which they apply. The procedures appear in the order the procedures are to be performed.

**Protection switching procedures for OC-12 virtual tributary bandwidth manager (VTBM) rings**

| Procedure | Task | See |
|---|---|---|
| 2-1 | Provisioning the OC-12 VTBM ring wait-to-restore period | page 2-8 |
| 2-13 | Provisioning DS1 protection parameters | page 2-32 |
| 2-14 | Provisioning DS3 or STS-1 protection parameters | page 2-34 |
| 2-16 | Provisioning OC-12 protection parameters | page 2-38 |
| 3-7 | Scheduling the exerciser for all ADMs in a ring | page 3-16 |
| 3-8 | Scheduling the exerciser for a single ADM | page 3-19 |

**Protection switching procedures for a point-to-point system**

| Procedure | Task | See |
|---|---|---|
| 2-13 | Provisioning DS1 protection parameters | page 2-32 |
| 2-14 | Provisioning DS3 or STS-1 protection parameters | page 2-34 |
| 2-15 | Provisioning OC-3 protection parameters | page 2-36 |
| 2-16 | Provisioning OC-12 protection parameters | page 2-38 |

**Protection switching procedures for a DS1-fed AccessNode (DFA) system**

| Procedure | Procedure | See |
|---|---|---|
| 2-13 | Provisioning DS1 protection parameters | page 2-32 |

**Protection switching procedures for an SE system**

| Procedure | Procedure | See |
|---|---|---|
| 2-13 | Provisioning DS1 protection parameters | page 2-32 |
| 2-15 | Provisioning OC-3 protection parameters | page 2-36 |

# Protection switching

This chapter contains procedures for switching to protection (or backup) circuits, locking out protection switching, and monitoring the status of protection switching events. Protection switching ensures that the AccessNode facilities have a backup if the equipment fails.

## Chapter task list

Specific provisioning tasks allow you to change the default values assigned by the system during the initial installation of the equipment. For lists of the required provisioning tasks, refer to "Overview of protection switching" on page 1-1.

This chapter includes the following tasks. They can be performed at any time and in any order.

| Procedure | Task | See |
|---|---|---|
| 2-1 | Provisioning the OC-12 VTBM ring wait-to-restore period | page 2-8 |
| 2-2 | Testing the protection groups on a shelf manually | page 2-10 |
| 2-3 | Exercising the processor manually | page 2-12 |
| 2-4 | Switching processor activity manually from active to standby | page 2-14 |
| 2-5 | Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout | page 2-16 |
| 2-6 | Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC forced protection switch | page 2-21 |
| 2-7 | Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC manual protection switch | page 2-25 |
| 2-8 | Operating or releasing a lockout of the TXC reference termination | page 2-27 |
| 2-9 | Performing a TXC timing reference forced switch | page 2-28 |
| **—continued—** | | |

| Procedure | Task | See |
|---|---|---|
| 2-10 | Performing a timing reference forced switch | page 2-29 |
| 2-11 | Performing a TXC timing reference manual switch | page 2-30 |
| 2-12 | Performing a timing reference manual switch | page 2-31 |
| 2-13 | Provisioning DS1 protection parameters | page 2-32 |
| 2-14 | Provisioning DS3 or STS-1 protection parameters | page 2-34 |
| 2-15 | Provisioning OC-3 protection parameters | page 2-36 |
| 2-16 | Provisioning OC-12 protection parameters | page 2-38 |
| 2-17 | Switching to the backup line interface card | page 2-40 |
| 2-18 | Switching to the backup transport interface card or processor | page 2-41 |
| 2-19 | Displaying protection summary information | page 2-42 |
| 2-20 | Displaying detailed protection information | page 2-43 |
| 2-21 | Displaying the timing reference protection status | page 2-44 |
| 2-22 | Disabling or enabling the exerciser on tributary and transport optics | page 2-45 |
| **—end—** | | |

*Note:* If you cannot successfully complete these procedures, contact your next level of support.

## Requirements for the procedure

Before starting any of the procedures in this chapter, you must know how to use the VT100-type network element user interface.

*Note 1:* For a reminder of how to use the interface, see *Network Element User Interface Description*, 323-3001-300, in *Operations, Administration, and Provisioning*, Volume 4A.

*Note 2:* To exit a partially entered command and to terminate field definition displays, type **abort**.

## Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12

The group number you enter in a command string depends on the shelf type and function, the mapper type, and its slot location. Table 2-1 summarizes the group and slot associations for the different mappers and shelves.

*Note:* The following tables do not imply that all slots are available for your configuration. For details about the capacity for each configuration, see the *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

**Table 2-1**
**Group and slot association matrix**

| Mapper and shelf function | | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| **DS1** | DS1-fed ABM | G1 | G2 | P | G4 | G5 | G6 | | | | | | | | | | | | | |
| | ABM FCOT or FCOT_BLSR | G1 | G2 | P | G4 | G5 | G6 | G7 | G8 | | | | | | | | | | | |
| | TBM FCOT | | | G3 | G4 | | | | | | | G5 | G6 | P | G8 | G9 | G10 | G11 | G12 | |
| | TBM FCOT_BLSR | G1 | G2 | G3 | G4 | | | | | | | G5 | G6 | P | G8 | G9 | G10 | G11 | G12 | |
| | TBM TN_BLSR | G1 | G2 | G3 | G4 | | | | | | | G5 | G6 | G7 | G8 | G9 | G10 | G11 | G12 | P |
| **DS3** | ABM | P | S | G1 | | G2 | | G3 | | | | | | | | | | | | |
| | TBM FCOT | P | S | | | | | | | | | G1 | | - | | G3 | | G4 | | |
| | TBM FCOT_BLSR or TN_BLSR | P | S | | | | | | | | | G1 | | G2 * | | G3 | | G4 | | |
| **STS-1** | TN_BLSR | | S | P | | | | | | | | G1 | | G2 | | G3 | | G4 | | |
| **OC-3** | ABM tributary | G3 | | G4 | | G1S | | G2S | | | | | | | | | | | | |
| | TBM tributary | G3 | | G4 | | G1S | | G2S | | | | G5 | | G6 | | G7 | | G8 | | |
| | Feeder | | | | | | | | | G1 | G2 | | | | | | | | | |
| **OC-12** | Feeder | | | | | | | | | G1 | G2 | | | | | | | | | |
| **OC-12 VTBM** | Feeder | | | | | | | | | G1 | G2 | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |

\*  For DS3 TBM FCOT_BLSR fiber-fed shelves, this group is available only if no DS1s are provisioned for that shelf.

### Group and slot associations for DS1, DS3, and STS-1 I/O cards

For some tasks, you must also know the slot numbers of the input cards and output cards. The chart below shows which table to use to determine the I/O slots for the mapper you need.

| If you are provisioning this equipment | For this shelf type | Then refer to |
|---|---|---|
| DS1 equipment | Access bandwidth manager (ABM) | Table 2-2 |
| | Transport bandwidth manager (TBM) | Table 2-3 |
| DS3 equipment | ABM | Table 2-4 |
| | TBM | Table 2-5 |
| STS-1 equipment | TBM | Table 2-6 |

For DS1, DS3, and STS-1 circuit packs, tables 2-2 through 2-6 show the association between mappers in the lower level of the common equipment shelf and input/output cards in the upper level.

For example, DS1 circuit pack group G1 refers to the group of modules including the working DS1/VT mapper circuit pack in slot 1 and its corresponding DS1 input and output cards in slots 30 and 32. Similarly, DS1 circuit pack group P refers to the group of modules including the protection DS1/VT mapper circuit pack in slot 3 and the DS1 protection bridge cards in slots 34 and 36.

### DS1 I/O numbers

Table 2-2 lists the DS1 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

**Table 2-2**
**ABM DS1 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | - |
| RFT | Group | g1* | g2* | P* | g4* | g5* | g6* | g7 | g8 | | | | | | | | | | | |
| RFT_BLSR | Input slot | 30* | 31* | 34p* | 35* | 38 | 39 | 42 | 43 | | | | | | | | | | | |
| FCOT | Output slot | 32* | 33* | 36p* | 37* | 40 | 41 | 44 | 45 | | | | | | | | | | | |
| FCOT_BLSR | | | | | | | | | | | | | | | | | | | | |

*Note 1:* * DS1 equipment allowed in a DS1-fed ABM shelf.

*Note 2:* The symbol "p" in the DS1 input and output slots denotes a protection bridge card.

*Note 3:* The feeder occupies slots 9 and 10. If an operations controller is installed, it occupies slots 5 through 8.

Table 2-3 lists the DS1 circuit pack groups for the different TBM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

**Table 2-3**
**TBM DS1 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| FCOT | Group | | | g3 | g4 | | | | | | | g5 | g6 | P | g8 | g9 | g10 | g11 | g12 | |
| | Input slot | | | 34 | 35 | | | | | | | 38 | 39 | 42p | 43 | 46 | 47 | 50 | 51 | |
| | Output slot | | | 36 | 37 | | | | | | | 40 | 41 | 44p | 45 | 48 | 49 | 52 | 53 | |
| FCOT_BLSR | Group | g1* | g2* | g3 | g4 | | | | | | | g5 | g6 | P | g8 | g9 | g10 | g11 | g12 | |
| | Input slot | 30* | 31* | 34 | 35 | | | | | | | 38 | 39 | 42p | 43 | 46 | 47 | 50 | 51 | |
| | Output slot | 32* | 33* | 36 | 37 | | | | | | | 40 | 41 | 44p | 45 | 48 | 49 | 52 | 53 | |
| TN_BLSR | Group | g1* | g2* | g3 | g4 | | | | | | | g5 | g6 | g7 | g8 | g9 | g10 | g11 | g12 | P |
| | Input slot | 30* | 31* | 34 | 35 | | | | | | | 38 | 39 | 42 | 43 | 46 | 47 | 50 | 51 | - |
| | Output slot | 32* | 33* | 36 | 37 | | | | | | | 40 | 41 | 44 | 45 | 48 | 49 | 52 | 53 | - |

*Note 1:* * FCOT_BLSR and TN_BLSR shelves can contain two additional DS1 working groups (compared to a fiber central office terminal [FCOT]) when DS3 protection mappers are not used in slots 1 and 2. The two additional DS1 working groups are g1 (slots 1, 30, 32) and g2 (slots 2, 31, 33).

*Note 2:* The symbol "p" in the DS1 input and output slots denotes a protection bridge card.

*Note 3:* The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

## DS3 I/O numbers

Table 2-4 lists the DS3 circuit pack groups for the ABM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

**Table 2-4**
**ABM DS3 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | - |
| RFT | Group | P | S | g1 | — | g2 | — | g3 | — | | | | | | | | | | | |
| RFT_BLSR FCOT FCOT_BLSR | I/O slots | — — — | — — — | 34 35 36 | | 38 39 40 | | 42 43 44 | | | | | | | | | | | | |

*Note 1:* The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

*Note 2:* The symbol "P" in slot 1 denotes a protection mapper; the symbol "S" in slot 2 denotes a protection switch card.

Table 2-5 lists the DS3 circuit pack groups for the TBM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

**Table 2-5**
**TBM DS3 mapper, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| FCOT | Group | P | S | — | — | | | | | | | g1 | — | g2* | — | g3 | — | g4 | — | — |
| FCOT_BLSR | I/O slots | — | — | | | | | | | | | 38 | | 42* | | 46 | | 50 | | |
| | | — | — | | | | | | | | | 39 | | 43* | | 47 | | 51 | | |
| TN_BLSR | | — | — | | | | | | | | | 40 | | 44* | | 48 | | 52 | | |

**Note 1:** * This group is available for FCOT_BLSR shelves that have no DS1s provisioned.

**Note 2:** The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

**Note 3:** The symbol "P" in slot 1 denotes a protection mapper; the symbol "S" in slot 2 denotes a protection switch card.

## STS-1 I/O numbers

Table 2-6 lists the STS-1 circuit pack groups for the TBM shelf functions. It also shows the association between mappers in the lower level of the shelf, and input cards and output cards in the upper level.

**Table 2-6**
**TBM STS-1 interface, group, and I/O numbers**

| Shelf function | Group or I/O slot | Mapper slot | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| TN_BLSR | Group | — | S | P | — | | | | | | | g1 | — | g2 | — | g3 | — | g4 | — | — |
| | I/O slots | — | — | | | | | | | | | 38 | | 42 | | 46 | | 50 | | |
| | | — | — | | | | | | | | | 39 | | 43 | | 47 | | 51 | | |
| | | — | — | | | | | | | | | 40 | | 44 | | 48 | | 52 | | |

**Note 1:** The feeder occupies slots 9 and 10. If an OPC is installed, it occupies slots 5 through 8.

**Note 2:** The symbol "P" in slot 3 denotes a protection mapper; the symbol "S" in slot 2 denotes a protection switch card.

## Procedure 2-1
# Provisioning the OC-12 VTBM ring wait-to-restore period

Use this procedure to change the wait-to-restore period for OC-12 virtual tributary bandwidth manager (VTBM) ring protection switching. You can set a period of 5 minutes through 12 minutes (in increments of 1 minute). The default OC-12 VTBM ring wait-to-restore period is five minutes.

The wait-to-restore feature activates in OC-12 VTBM ring protection switching when all signal failures in the ring are cleared. When the failure occurs, a switch to the protection circuit pack is completed. When the faulty circuit pack, fiber, or node is replaced, the processor circuit pack monitors the new OC-12 line or fiber for a period of 5 minutes through 12 minutes to ensure that the working path is functional. Once the wait-to-restore period is over, the traffic is routed back to the working circuit pack, thereby making the span available to protect other ring failures.

*Note:* No wait-to-restore feature is available for the transport optics (OC-3/OC-12) in a point-to-point system.

## Requirements

Before starting this procedure, log in to the network element user interface and be at the main menu level.

## Action

| Step | Action |
|------|--------|
| 1 | Display the protection screen by entering:<br>**protectn** ↵ |
| 2 | Display the detailed protection screen and select the service type by entering:<br>**dtlprot oc12** ↵ |
| 3 | Display the protection provisioning screen by entering:<br>**protprov** ↵<br>*The OC-12 protection provisioning screen appears, indicating the current wait-to-restore period.* |

**—continued—**

Procedure 2-1 (continued)
**Provisioning the OC-12 VTBM ring wait-to-restore period**

| Step | Action |
|------|--------|
| **4** | Change the wait-to-restore period by entering: |

**waittor  <duration>**↵

where

<duration> duration in minutes: **5**, **6**, **7**, **8**, **9**, **10**, **11**, or **12**

For an online explanation of waittor, enter:

**q  waittor**↵

*An explanation appears on screen.*

***Note:*** The default wait-to-restore period is 5 minutes.

—**end**—

## Procedure 2-2
# Testing the protection groups on a shelf manually

Use this procedure to manually test OC-3, OC-12, DS1, DS3, and STS-1 protection paths on a shelf without affecting service. The exerciser tests the condition of each protection path to ensure that no failures occur that would not be detected until a protection switch occurred.

This procedure is for a manual exerciser. However, you can schedule the exerciser to run automatically as a network event. See *System Administration Procedures*, 323-3001-302, in *Operations, Administration, and Provisioning*, Volume 4A for details.

## Requirements

The exerciser does not perform a test if equipment is locked out, out of service, deleted, or unequipped. An active protection switch cannot be in effect when you perform this test. For an OC-3 or OC-12 exercise test, Rx traffic must be on G1.

## Action

| Step | Action |
| --- | --- |
| 1 | From the Network Element Status screen, display the equipment shelf screen by entering: |

**eq  sh**↵

*The equipment shelf screen appears.*

| 2 | Run the exercise test by entering: |

**exercise**↵

*The system displays the following message:*

```
The shelf exerciser has been initiated. Please refer to
EQP608 logs for results.
```

Equipment (EQP) log reports show the results of the test.

<div align="center">**—continued—**</div>

Procedure 2-2 (continued)
**Testing the protection groups on a shelf manually**

| Step | Action |
|------|--------|
| **3** | To view the log report, display the Log Utility screen by entering: |
| | **admin  nep;logs**↵ |
| | *The Log Utility screen appears.* |
| | ***Note:*** You can use the command **logutil** to access the Log Utility screen. |
| **4** | Display the last EQP log generated by entering: |
| | **open  eqp**↵ |
| | If the last EQP log is not the EQP608 log, type **back**↵ until the EQP608 log appears. |
| | *Log Report Manual*, 323-3001-840, in *Maintenance,* Volume 5B, explains each log report. |
| **5** | Return to the Network Element Status screen by entering: |
| | **quit**↵ |

—end—

## Procedure 2-3
# Exercising the processor manually

Use this procedure to manually exercise (test) the inactive processor in a duplex configuration.

## Requirements

Before you can manually exercise the inactive processor in a duplex configuration, both processors must be in-service normal (IS-NR).

The routine exercise must be enabled (on). If the routine exercise is not enabled, use the command RexEna on the Proc equipment screen to toggle the value from off to on.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the equipment shelf screen by entering:<br><br>**eq  proc  <group>**↵<br><br>where<br><br><group>        processor group number: **a** or **b**<br><br>*The equipment shelf screen appears.* |
| **2** | Check that the state of the active and redundant processors is IS. |

| If both processors are | Then |
|------------------------|------|
| not in service | Return to the Network Element Status screen by entering:<br><br>**quit**↵ |
| in service (IS) | Perform the exercise test by entering:<br><br>**exercise**↵<br><br>The EQP612 log report shows the results of the exercise test. |

—**continued**—

Procedure 2-3 (continued)
**Exercising the processor manually**

| Step | Action |
| --- | --- |
| **3** | To view the log report, display the Log Utility screen by entering: |
|  | **admin  nep;logs**↵ |
|  | *The Log Utility screen appears.* |
|  | ***Note:*** You can also use the command **logutil** to access the Log Utility screen. |
| **4** | Display the last equipment (EQP) log generated by entering: |
|  | **open  eqp**↵ |
|  | If the last EQP log is not the EQP612 log, enter **back.**↵  until the EQP612 log appears. |
|  | ***Note:*** For descriptions of each log report, see *Log Report Manual*, 323-3001-840, in *Maintenance,* Volume 5B. |
| **5** | Return to the Network Element Status screen by entering: |
|  | **quit**↵ |

<div align="center">—end—</div>

## Procedure 2-4
# Switching processor activity manually from active to standby

Use this procedure to switch processor activity from the active processor to the standby processor. A backup processor must be in the in-service state, with valid data and an initialized software load.

Use the force option in the following procedure only when both processors are faulty, and you want to switch activity to the processor with the less severe fault. This procedure affects GR-303 DMS/MVI calls in progress for about 30 seconds.

*Note:* If you use the force option to switch activity from a trouble-free processor to a faulty processor, the system automatically switches activity back to the trouble-free processor.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the processor equipment screen by entering: |

**eq  proc  <group>**↵

    where

    <group>        processor group number: **a** or **b**

---

⚠ **CAUTION**
**Possible loss of service**
DS1 and DS31 protection switching is unavailable during a switch of activity (SWACT) of the processor cards. If a DS1/VT mapper or a DS3/STS mapper fails while a SWACT is in progress, traffic cannot be switched to the protection mapper. Protection switching is available after the SWACT when you are prompted to log in to the network element.

---

—**continued**—

Procedure 2-4 (continued)
**Switching processor activity manually from active to standby**

| Step | Action |
|------|--------|
| **2** | Switch activity to the backup (redundant unit) processor. |

*Note:* Use the force option in the following command string only when both processors are faulty, and you want to force activity to the processor with the less severe fault.

**switch  [force]** ↵

*The system prompts for confirmation of the switch request.*

*Note:* During a processor card SWACT, the green active LED on working DS1/VT mappers and DS3/STS mappers goes out for approximately 20 seconds. The DS1/DS3 mappers are fully functional during this 20-second interval, and no loss of traffic occurs.

| Step | Action |
|------|--------|
| **3** | Confirm or cancel the switch request: |

To confirm the switch:

**y**↵

To cancel the switch:

**n**↵

*Processor activity switches to the backup processor within 5 seconds, and the active LED on the card is updated. After you log back in to the network element, the Protection State field on the screen changes from standby to active.*

| Step | Action |
|------|--------|
| **4** | Log back in to the network element user interface. |

*Note:* You must wait 7 minutes before performing another protection switch on the same processor cards.

—end—

## Procedure 2-5
# Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout

Use this procedure to operate or release a protection switch lockout against a DS1, DS3, STS-1, OC-3, OC-12, ESI (external synchronization interface), or TXC (timing and cross-connect) circuit pack group. (To operate or release a lockout for the ESI or TXC timing reference, see page 2-27.)

When a protection switch lockout is in effect for a working circuit pack group, the locked-out circuit pack group cannot switch to the standby (protection) circuit pack group if a failure occurs.

When a protection switch lockout is in effect for the standby (protection) circuit pack group, protection is unavailable for all circuit pack groups of the same type.

If the protection group is carrying traffic when it is locked out, traffic switches back to the working group.

The protection switch lockout overrides all other protection features, including automatic protection switching.

The following special considerations apply to OC-12 rings:

- In a virtual tributary bandwidth manager (VTBM) ring, a lockout of protection command on any span in the ring locks out all protection for the entire ring including the span that has the active lockout protection switch.

- If you issue the lockout-of-working command from the local network element user interface, you must explicitly enter it at both add-drop multiplexer (ADM) nodes terminating the span. When you enter the command through the network element user interface, a warning message indicates that you must also issue the command at the adjacent ADM node. If the command is entered at only one end, a protection switch is still prevented on that span. However, if a protection switch is requested at the far end, a "Protection switch fail" alarm is raised. Entering the command at both ends prevents this alarm from being raised.

—continued—

Procedure 2-5 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout**

---

> **CAUTION**
> **Risk of traffic loss**
> Initiating a protection switch causes a momentary loss of
> traffic. Maximum switching time is 50 ms.

> **CAUTION**
> **Risk of traffic loss**
> Do not operate or release a lockout on a DS1, DS3, or STS-1
> circuit pack during a firmware download of an OC-12
> VTBM optical interface circuit pack.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the protection switching screen by entering:<br><br>**pr**↵<br><br>*The protection switching screen appears.* |
| **2** | Display the detailed Protection screen by entering:<br><br>**dtlprot  \<type\>**↵<br><br>where<br><br>\<type\>    type of circuit pack group: **ds1**, **ds3**, **sts1**, **oc3**, **oc12**, **esi,** or **txc**<br><br>\<unit \>    required only for OC-3 tributaries (see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2)<br><br>*The detailed Protection screen appears.* |

—continued—

Procedure 2-5 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout**

| Step | Action |
|------|--------|

**3** Complete the instructions in the following table based on the type of equipment.

| To operate or release a lockout for | Enter | |
|---|---|---|
| a DS1, DS3, or STS-1 | **lockout <action> <group>**↵<br>**y**↵<br>where | |
| | <action> | operate or release the lockout: **op** or **re** |
| | <group> | number of the group to lockout or release<br>(see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2) |
| an OC-3 (feeder) or OC-12 (point-to-point) | **lockout <action>** ↵<br>**y**↵<br>where | |
| | <action> | operate or release the lockout: **op** or **re** |
| an ESI | **lockout <action> <group>**↵<br>**y**↵<br>where | |
| | <action> | operate or release the lockout: **op** or **re** |
| | <group> | group number of the ESI: **g1** or **g2** |
| a TXC | **lockout <action>** ↵<br>**y**↵<br>where | |
| | <action> | operate or release the lockout: **op** or **re** |
| **—continued—** | | |

—continued—

Procedure 2-5 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout**

**Step    Action**

| To operate or release a lockout for | Enter |
|---|---|
| an OC-3 tributary | **lockout  \<action\>  \<group\>**↵<br>**y**↵<br>where<br><br>\<action\>        operate or release the lockout: **op** or **re**<br><br>\<group\>        number of the group to lockout or release<br>                   (see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2)<br><br>***Note:*** When you perform a lockout on OC-3 tributaries, the lockout count can indicate a value of 2 instead of 1. This problem occurs because of a software limitation, but does not impact the operation of the lockout command because a single lockout occurs. |
| an OC-12 (ring) | **lockout  \<action\>  \<group\>**↵<br>**y**↵<br>where<br><br>\<action\>        to operate the lockout for a ring: **op p** (operate protection), or **op w** (operate working)<br>                   to release the lockout for a ring; **re p** (release protection), or **re w** (release working)<br><br>\<group\>        group number: **g1** or **g2** |
| **—end—** ||

**—continued—**

Procedure 2-5 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC protection switch lockout**

| Step | Action |
|------|--------|
| | *When you operate a lockout, the screen displays an asterisk (\*) in the Lockout column. The system updates the banner line under the Lockout column and raises a "Lockout request" alarm.* |
| | *When you release a lockout, the screen displays a period (.) in the Lockout column. The system updates the banner line under the Lockout column and clears the "Lockout request" alarm.* |
| **4** | After you complete the Protection screen, return to the Network Element Status screen by entering:<br><br>**quit  2**↵ |

—**end**—

## Procedure 2-6
# Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC forced protection switch

Use this procedure to operate or release a DS1, DS3, STS-1, OC-3, OC-12, ESI (external synchronization interface), or TXC (timing and cross-connect) forced protection switch.

A forced switch overrides any existing protection switch except a lockout.

When you operate a forced protection switch on a DS1, DS3, or STS-1 circuit pack group, its traffic is rerouted to the protection group regardless of the condition of the protection group. The traffic on the working OC-3 or OC-12 group is rerouted to the protection group only if the protection group has not failed.

The following special considerations apply to virtual tributary bandwidth manager (VTBM) rings:

- A forced switch forces the working add-drop traffic from the STS-1 time slots (1 to 6) on the specified optical circuit pack group to the corresponding protection time slots (7 to 12) on the counterpart group; if the forced switch is applied to G1, the working traffic from G1 is placed on the protection time slot of G2. The protection time slots on the protecting circuit pack group receive pass-through traffic, which then loops back to the corresponding working time slots on that group (that is, in the reverse direction).

- The ring is segmented if multiple forced switch commands are issued in the ring.

   *Note:* If a signal failure occurs on the same span where you requested a forced switch, the forced switch is accepted, and the traffic is protected.

**—continued—**

Procedure 2-6 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC forced protection switch**

> **CAUTION**
> **Risk of traffic loss**
> Initiating a protection switch causes momentary loss of
> traffic. Maximum switching time is 50 ms.

> **CAUTION**
> **Risk of traffic loss**
> Do not operate or release a forced switch on a DS1, DS3, or
> STS-1 circuit pack during a firmware download of an OC-12
> VTBM optical interface circuit pack.

## Action

| Step | Action |
|------|--------|

**1** From the Network Element Status screen, display the protection switching
screen by entering:

**pr**↵

*The Protection switching screen appears.*

> **CAUTION**
> **Possible loss of service**
> DS1 and DS3 protection switching is unavailable during a switch
> of activity (SWACT) of the processor cards. If a DS1/VT mapper
> or a DS3/STS mapper fails while a SWACT is in progress, traffic
> cannot be switched to the protection mapper. Protection switching
> is available (after the SWACT) when the user is prompted to log in
> to the network element.
>
> DS1/DS3/STS-1 protection switching is also unavailable if the
> maintenance interface card (MIC) has failed or is not in service.

Procedure 2-6 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC forced protection switch**

| Step | Action |
|------|--------|
| | |

**2**      Display the detailed Protection screen by entering:

**dtlprot  <type>**↵
  where

  <type>                     type of circuit pack group: **ds1, ds3, sts1,
                             oc3, oc12**, **esi,** or **txc**

  <unit >                    required only for OC-3 tributaries
                             (see "Group and slot associations for DS1,
                             DS3, STS-1, OC-3, and OC-12" on page 2-2)

*The detailed Protection screen appears.*

> **CAUTION**
> **Possible loss of OC-3/OC-12 service**
> Before issuing a manual force switch command to switch to a
> failed OC-3/OC-12 card, ensure that Route Diversity is turned ON.
> Route Diversity ON ensures that you do not lose data
> communications to remote shelves during the force override. For
> details on provisioning Route Diversity, see "Provisioning OC-3
> protection parameters" on page 2-36 and "Provisioning OC-12
> protection parameters" on page 2-38.

**3**      Operate or release the forced switch by entering:

**forced  <action>  <group>**↵
**y**↵
  where

  <action>                   operate or release the forced switch: **op** or **re**

  <group>                    group number: For DS1, DS3, or STS-1, see
                             "Group and slot associations for DS1, DS3, STS-1,
                             OC-3, and OC-12" on page 2-2.

                             For OC-3 (feeder), OC-12, ESI or TXC: **g1** or **g2**

                             For OC-3 tributaries: See "Group and slot
                             associations for DS1, DS3, STS-1, OC-3, and
                             OC-12" on page 2-2.

**—continued—**

Procedure 2-6 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC forced protection switch**

| Step | Action |
|------|--------|
| | *When you operate a forced switch, the screen displays an asterisk (\*) in the Forced column. The system updates the banner line under the ActProt column, and raises a "Forced switch request" alarm.* |
| | *When you release a forced switch, the screen displays a period (.) in the Forced column. The system updates the banner line under the ActProt column and clears the "Forced switch request" alarm.* |
| **4** | After completing the Protection screen, return to the Network Element Status screen by entering:<br><br>**quit  2**↵ |

—end—

Procedure 2-7
# Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC manual protection switch

Use this procedure to operate or release a DS1, DS3, STS-1, OC-3, OC-12, ESI (external synchronization interface), or TXC (timing and cross-connect) manual protection switch.

When you operate a manual protection switch on an OC-3 or OC-12 group, its traffic is routed to the protection group only if the protection group has no failures. When you operate a manual protection switch on a DS1, DS3, or STS-1 group, its traffic is routed to the protection group even if the protection group has failed. A manual switch does not override automatic protection or a lockout.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the protection switching screen by entering:<br><br>**pr**↵<br><br>*The protection switching screen appears.* |

> ⚠ **CAUTION**
> **Possible loss of service**
> DS1 and DS3 protection switching is unavailable during a switch of activity (SWACT) of the processor cards. Protection switching is available (after the SWACT) when the user is prompted to log in to the network element.

| | |
|------|--------|
| **2** | Display the detailed Protection screen by entering:<br><br>**dtlprot  <type> [<unit>]**↵<br><br>where<br><br><type>    type of protection: **ds1, ds3, sts1, oc3, oc12, esi,** or **txc**<br><br><unit >    required only for OC-3 tributaries<br>(see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2)<br><br>*The detailed Protection screen appears.* |

**—continued—**

Procedure 2-7 (continued)
**Operating or releasing a DS1, DS3, STS-1, OC-3, OC-12, ESI, or TXC manual protection switch**

| Step | Action |
|------|--------|

**3**　　　Operate or release the manual switch by entering:

**manual  <action>  <group>**↵
**y**↵

where

<action>　　　operate or release the manual switch: **op** or **re**

<group>　　　number of the group: For DS1, DS3, STS-1, OC-3, or OC-12: See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2.

For ESI or TXC: **g1** or **g2**

*When you operate a manual switch, the screen displays an asterisk (*) in the Manual column. The system updates the banner line under the ActProt column and raises a "Manual switch request" alarm.*

*When you release a manual switch, the screen displays a period (.) in the Manual column. The system updates the banner line under the ActProt column and clears the "Manual switch request" alarm.*

**4**　　　After completing the Protection screens, return to the Network Element Status screen by entering:

**quit  2**↵

—end—

## Procedure 2-8
# Operating or releasing a lockout of the TXC reference termination

Use this procedure to operate or release a protection switch lockout for the primary or secondary timing and cross-connect (TXC) reference termination. If the active termination is primary, the switch is to the secondary reference termination.

## Action

| Step | Action |
|------|--------|
| **1** | Display the protection switching screen by entering:<br>**pr** ↵<br>*The NE Transport Protection screen appears.* |
| **2** | Display the timing reference protection screen by entering:<br>**trefprot** ↵<br>*The TXC Reference Protection screen appears.* |
| **3** | Operate or release the lockout by entering:<br>**lockout <action> <timing reference>** ↵ |

       where

| | |
|---|---|
| <action> | operate or release the lockout: **op** or **re** |
| <timing reference> | primary or secondary timing reference: **pri** or **sec**<br>(lockout is not permitted for the standby timing reference) |

*A request for confirmation of the action appears.*

| Step | Action |
|------|--------|
| **4** | Confirm the request by entering:<br>**y** ↵<br>(To cancel the request, enter **n**.)<br>*The screen displays an asterisk (\*) in the Lockout column.* |

—**end**—

## Procedure 2-9
# Performing a TXC timing reference forced switch

Use this procedure to operate or release a forced switch on a selected timing and cross-current (TXC) timing reference facility. A forced switch request has a higher priority than an automatic or manual protection switch.

---

**CAUTION**
**Possible loss of synchronization**
Performing repeated reference switches without allowing time for the system to lock to the active reference can cause a temporary loss of synchronization with the timing reference source. Wait 30 seconds before repeating a forced switch on a timing reference facility.

---

## Action

| Step | Action |
|------|--------|
| **1** | Display the protection switching screen by entering: |
| | **pr** ↵ |
| | *The NE Transport Protection screen appears.* |
| **2** | Display the timing Reference Protection screen by entering: |
| | **trefprot** ↵ |
| | *The TXC Reference Protection screen appears.* |
| **3** | Operate or release the forced switch by entering: |
| | **forced <action> <timing reference>** ↵ |

where

| <action> | operate or release the switch: **op** or **re** |
|----------|--------------------------------------------------|
| <timing reference> | primary or secondary timing reference: **pri** or **sec** |

*A request for confirmation of the action appears.*

| **4** | Confirm the request by entering: |
|-------|----------------------------------|

**y** ↵

(To cancel the request, enter **n**.)

*The screen displays an asterisk (\*) in the Forced column.*

***Note:*** If the active TXC is in the freerun or holdover mode, a forced switch applied to the TXC reference indicates a pending (r) request, not an active (\*) status.

—**end**—

# Procedure 2-10
# **Performing a timing reference forced switch**

Use this procedure to operate or release a forced switch on a selected timing reference. A forced switch request has a higher priority than an automatic or manual protection switch.

---

**CAUTION**
**Possible loss of synchronization**
Performing repeated reference switches without allowing time for the system to lock to the active reference can cause a temporary loss of synchronization with the timing reference source. Wait 30 seconds before repeating a forced switch on a timing reference facility.

---

*Note:* When you operate a timing reference forced switch, the system generates the following minor alarm: Fac CE TGen 1 Reference forced switch request.

## Action

| Step | Action |
|------|--------|
| **1** | Display the protection switching screen by entering:<br>**pr** ↵<br>*The NE Transport Protection screen appears.* |
| **2** | Display the timing Reference Protection screen by entering:<br>**trefprot** ↵<br>*The Reference Protection screen appears.* |
| **3** | Operate or release the forced switch by entering:<br>**forced <action> <timing reference>** ↵<br>where<br>    <action>          operate or release the switch: **op** or **re**<br>    <timing reference>   timing reference is: **1, 2, 3,** or **4**<br>*A request for confirmation of the action appears.* |
| **4** | Confirm the request by entering:<br>**y** ↵<br>(To cancel the request, enter **n**.)<br>*The screen displays an asterisk (\*) in the Forced column.* |

<div align="center">—end—</div>

# Procedure 2-11
# **Performing a TXC timing reference manual switch**

Use this procedure to operate or release a manual switch on a selected timing and cross-current (TXC) timing reference facility. A manual switch request has a lower priority than an automatic or forced protection switch.

| | CAUTION<br>**Possible loss of synchronization**<br>Performing repeated reference switches without allowing time for the system to lock to the active reference can cause a temporary loss of synchronization with the timing reference source. Wait 30 seconds before repeating a forced switch on a timing reference facility. |
|---|---|

## **Action**

| Step | Action |
|---|---|
| 1 | Display the protection switching screen by entering:<br>**pr** ↵<br>*The NE Transport Protection screen appears.* |
| 2 | Display the timing Reference Protection screen by entering:<br>**trefprot** ↵<br>*The TXC Reference Protection screen appears.* |
| 3 | Operate or release the manual switch by entering:<br>**manual <action> <timing reference>** ↵<br>where<br><action>        operate or release the switch: **op** or **re**<br><timing reference>    primary or secondary timing reference: **pri** or **sec**<br>*A request for confirmation of the action appears.* |
| 4 | Confirm the request by entering:<br>**y** ↵<br>(To cancel the request, enter **n**.)<br>*The screen displays an asterisk (\*) in the Manual column.*<br>***Note:*** A transition from normal (.) to active (\*) and back to normal (.) indicates a manual switch of a TXC.<br><div align="center">—**end**—</div> |

## Procedure 2-12
# **Performing a timing reference manual switch**

Use this procedure to operate or release a manual switch on a selected timing reference facility. A manual switch request has a lower priority than an automatic or forced protection switch.

> **CAUTION**
> **Possible loss of synchronization**
> Performing repeated reference switches without allowing time for the system to lock to the active reference can cause a temporary loss of synchronization with the timing reference source. Wait 30 seconds before repeating a forced switch on a timing reference facility.

## Action

| Step | Action |
|------|--------|
| **1** | Display the protection switching screen by entering: |
| | **pr** ↵ |
| | *The NE Transport Protection screen appears.* |
| **2** | Display the timing Reference Protection screen by entering: |
| | **trefprot** ↵ |
| | *The Reference Protection screen appears.* |
| **3** | Operate or release the manual switch by entering: |
| | **manual <action> <timing reference>** ↵ |
| | where |
| | <action>                   operate or release the switch: **op** or **re** |
| | <timing reference>     timing reference: **1, 2, 3,** or **4** |
| | *A request for confirmation of the action appears.* |
| **4** | Confirm the request by entering: |
| | **y** ↵ |
| | (To cancel the request, enter **n**.) |
| | *The screen displays an asterisk (*) in the Manual column.* |

—end—

# Procedure 2-13
## **Provisioning DS1 protection parameters**

Use this procedure to provision the DS1 protection switching parameters listed in Table 2-7.

**Table 2-7**
**DS1 protection switching parameters**

| Parameter | Menu command | Setting and explanation | Default |
|-----------|--------------|-------------------------|---------|
| Wait To Restore | waittor | sets wait-to-restore period to 200 or 300 seconds for the protection group | 200 |
| Priority | priority | sets DS1 protection priority to high or low for the specified DS1 circuit pack group | low |

## **Action**

| Step | Action |
|------|--------|

**1**     From the Network Element Status screen, display the protection switching screen by entering:

**pr**↵

*The protection switching screen appears.*

**2**     Display the detailed protection screen by entering:

**dtlprot  ds1; protprov**↵

*The DS1 Protection Provisioning screen appears.*

—**continued**—

Procedure 2-13 (continued)
**Provisioning DS1 protection parameters**

| Step | Action |
|------|--------|

**3**     Set or change any or all of the protection parameters listed in the following table.

Make any number of settings or changes before proceeding to step 4**.**

*Note:* If you are provisioning a parameter for the first time, set both the wait-to-restore period and the priority level.

| To set or change | Enter |
|------------------|-------|
| wait to restore | **waittor <duration>**↵ <br> where <br> <duration>    duration in seconds: **200** or **300** <br> For an on-line explanation of waittor, enter: <br> **q waittor**↵ <br> *An explanation appears on screen.* |
| priority level | **priority  <unit>  <level>**↵ <br> where <br> <unit>        number of the DS1 group <br> (see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2) <br> <level>        level of priority: **low** or **high** <br> Repeat this step for each DSI group. <br> For an on-line explanation of priority, enter <br> **q priority**↵ <br> *An explanation appears on screen.* |

*The parameter settings appear in reverse video when you set or change them.*

**4**     Return to the Network Element Status screen by entering:

**fwpui**↵

—end—

# Procedure 2-14
# **Provisioning DS3 or STS-1 protection parameters**

Use this procedure to provision the DS3 or STS-1 protection switching parameters listed in Table 2-8.

**Table 2-8**
**DS3/STS-1 protection switching parameters**

| Parameter | Menu command | Setting and explanation | Default |
|---|---|---|---|
| Wait To Restore | waittor | sets wait-to-restore period to 200 or 300 seconds for the protection group | 200 |
| Priority | priority | sets DS3 or STS-1 protection priority to high or low for the specified DS3 or STS-1 circuit pack group | low |

## Action

| Step | Action |
|---|---|

**1**      From the Network Element Status screen, display the protection switching screen by entering:

**pr**↵

*The protection switching screen appears.*

**2**      Display the detailed protection screen by entering:

**dtlprot  <type>; protprov**↵

  where

  <type>              **ds3** or **sts1**

*The appropriate protection provisioning screen appears.*

—**continued**—

Procedure 2-14 (continued)
**Provisioning DS3 or STS-1 protection parameters**

| Step | Action |
|------|--------|

**3**  Set or change any or all of the protection parameters listed in the following table.

Make any number of settings or changes before proceeding to step 4.

*Note:* If you are provisioning a parameter for the first time, set both the wait-to-restore period and the priority level.

| To set or change | Enter |
|------------------|-------|
| wait to restore | **waittor <duration>**↵<br>where<br><duration>     duration in seconds: **200** or **300**<br>For an on-line explanation of waittor, enter:<br>**q waittor**↵<br>*An explanation appears on screen* |
| priority level | priority  <unit>  <level>↵<br>where<br><unit>           number of the DS3 or STS-1 group<br>                     (see "Group and slot associations for<br>                     DS1, DS3, STS-1, OC-3, and OC-12"<br>                     on page 2-2)<br><level>          level of priority: **low** or **high**<br>Repeat this step for each DS3 or STS-1 group.<br>For an on-line explanation of priority, enter:<br>**q priority**↵<br>*An explanation appears on screen.* |

*The parameter settings appear in reverse video when you set or change them.*

**4**  Return to the Network Element Status screen by entering:

**fwpui**↵

—end—

Procedure 2-15
# Provisioning OC-3 protection parameters

Use this procedure to provision the OC-3 protection switching parameters
listed in Table 2-9.

**Table 2-9**
**OC-3 protection switching parameters**

| Parameter | Menu command | Setting and explanation | Default |
|-----------|--------------|-------------------------|---------|
| Route Diversity | **routediv** | route diversity:<br>ON sends and receives SONET overhead on working and protection groups;<br>OFF uses the working channel only. Both network elements (NEs) must be set with the same route diversity. | on |
| Switch Mode | **swmode** | sets protection switching mode to unidirectional or bidirectional for the protection group | bidirectional |

Provision the same OC-3 protection parameters at both the central office
network element and the remote network element.

Route diversity for OC-3 tributaries is not supported.

## Action

| Step | Action |
|------|--------|

**1**      From the Network Element Status screen, display the protection switching
screen by entering:

**pr**↵

*The protection switching screen appears.*

**2**      Display the detailed protection screen by entering:

**dtlprot  oc3; protprov**↵

*The Protection Provisioning screen appears.*

—continued—

Procedure 2-15 (continued)
**Provisioning OC-3 protection parameters**

| Step | Action |
|------|--------|

**3**    Provision one or more of the following protection parameters in any order.

| To set or change | Enter |
|------------------|-------|
| route diversity | **routediv <status>**↵<br>where<br><status>      route diversity status: **on** or **off**<br>The route diversity appears in reverse video.<br>For an on-line explanation of routediv, enter:<br>**q routediv**↵<br>*An explanation appears on screen.* |
| switch mode | swmode <mode>↵<br>where<br><mode>      switch mode: **uni** or **bi**<br>The switch mode appears in reverse video.<br>For an on-line explanation of swmode, enter:<br>**q swmode**<br>*An explanation appears on screen.* |

*The parameter settings appear in reverse video when you set or change them.*

**4**    Return to the Network Element Status screen by entering:

**fwpui** ↵

**5**    Provision the same settings for the OC-3s at the far-end network element.

—**end**—

# Procedure 2-16
# **Provisioning OC-12 protection parameters**

Use this procedure to provision the OC-12 protection switching parameters listed in Table 2-10.

**Table 2-10**
**OC-12 protection switching parameters**

| Parameter | Menu command | Setting and explanation | Default |
|-----------|--------------|-------------------------|---------|
| Route Diversity | **routediv** | route diversity: ON sends and receives SONET overhead on working and protection groups; OFF uses the working channel only. Both network elements (NEs) must be set with the same route diversity. | on |
| Switch Mode | **swmode** | sets protection switching mode to unidirectional or bidirectional for the protection group | bidirectional |

Provision the same OC-12 protection parameters at both the central office network element and the remote network element.

An OC-12 ring is configured as a route diverse system by default, and the diversity setting cannot be changed. Consequently, the routediv command in this procedure has no effect on an OC-12 ring.

## **Action**

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the protection switching screen by entering:<br>**pr**↵<br>*The protection switching screen appears.* |

**—continued—**

Procedure 2-16 (continued)
**Provisioning OC-12 protection parameters**

| Step | Action |
|------|--------|

**2** Display the detailed protection screen by entering:

**dtlprot  oc12; protprov**↵

*The Protection Provisioning screen appears.*

**3** Provision one or more of the following protection parameters in any order.

| To set or change | Enter |
|------------------|-------|
| route diversity | **routediv <status>**↵<br>where<br><status>        route diversity status: **on** or **off**<br>The route diversity appears in reverse video.<br>For an on-line explanation of routediv, enter:<br>**q routediv**↵<br>*An explanation appears on screen.* |
| switch mode | swmode <mode>↵<br>where<br><mode>        switch mode: **uni** or **bi**<br>The switch mode appears in reverse video.<br>For an on-line explanation of swmode, enter:<br>**q swmode**<br>*An explanation appears on screen.* |

*The parameter settings appear in reverse video when you set or change them.*

**4** Return to the Network Element Status screen by entering:

**fwpui** ↵

**5** Provision the same settings for the OC-12s at the far-end network element.

—**end**—

# Procedure 2-17
# **Switching to the backup line interface card**

Use this procedure to switch operation from the primary line interface card (LIC) to the backup LIC.

## Requirements

The shelf must contain a backup LIC.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the LIC equipment screen by entering:<br>**eq  lic**↵<br>*The LIC equipment screen appears.* |
| **2** | Display the detailed LIC screen by entering:<br>**dtllic  &lt;cds&gt;  &lt;group&gt;**↵<br>  where<br>  &lt;cds&gt;    number of the copper distribution shelf (CDS) that contains the LIC: **1** to **7**<br>  &lt;group&gt;    group number of the LIC: **a, b, c,** or **d**<br>*The detailed LIC equipment screen appears.* |
| **3** | Switch to the backup LIC by entering:<br>**switch**↵<br>*The system prompts for confirmation.* |
| **4** | Confirm the switch by entering:<br>**y**↵<br>*The system confirms the switch.* |
| **5** | Return to the Network Element Status screen by entering:<br>**quit**↵ |

<div align="center">**—end—**</div>

## Procedure 2-18
# Switching to the backup transport interface card or processor

Use this procedure to switch operation from the primary transport interface card (TIC) or processor (Proc) to the backup TIC or Proc.

*Note:* After a protection switch occurs, you must wait 7 minutes before performing another protection switch on the same processor cards.

## Requirements

The shelf must contain a backup TIC or Proc.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the required TIC or Proc equipment screen by entering: |
| | **eq  <type>  <group>**↵ |
| | where |
| | <type>          type of circuit pack: **tic** or **proc** |
| | <group>          group number of the circuit pack: **a** or **b** |
| | *The selected equipment screen appears (either TIC or Proc).* |
| **2** | Switch to the backup circuit pack by entering: |
| | **switch**↵ |
| | *The system prompts for confirmation.* |
| **3** | Confirm the switch by entering: |
| | **y**↵ |
| | *The system confirms the switch.* |
| **4** | Return to the Network Element Status screen by entering: |
| | **quit**↵ |
| | —end— |

## Procedure 2-19
# Displaying protection summary information

Use this procedure to display a summary of how many facilities on your network element (NE) have switched to the backup equipment, how many have attempted and failed, and how many have been locked out. The information is displayed on a single line with the protection summary information grouped into high bandwidth and low bandwidth facilities.

## Action

| Step | Action |
|------|--------|
| 1 | From the Network Element Status screen, display the protection switching screen by entering:<br>**pr**↵<br>*The Transport Protection switching screen appears.* |
| 2 | To obtain a summary list of protection switching events, enter:<br>**listprot**↵<br>*The screen listing protection events appears.* |
| 3 | After reviewing the protection summary screens, return to the Network Element Status screen by entering:<br>**quit**↵ |

<div align="center">**—end—**</div>

## Procedure 2-20
# Displaying detailed protection information

Use this procedure to display basic information about the following circuit pack protection groups: DS1, DS3, STS-1, OC-3, OC-12, TXC (timing and cross-current), or ESI (external synchronization interface).

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the protection switching screen by entering: |

**pr**↵

*The protection switching screen appears.*

**2**      Display the detailed Protection screen by entering:

**dtlprot   &lt;type&gt;**↵

        where

     &lt;type&gt;        type of circuit pack group: **ds1, ds3, sts1, oc3, oc12, txc** or **esi**

     &lt;unit &gt;       is required only for OC-3 tributaries (see "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2)

*The detailed Protection screen appears.*

**3**      After reviewing the detailed Protection screen, return to the Network Element Status screen by entering:

**quit  2**↵

                         **—end—**

## Procedure 2-21
# Displaying the timing reference protection status

Use this procedure to display the protection status of the timing references and their associated switch operations.

## Action

| Step | Action |
|------|--------|
| **1** | From the Network Element Status screen, display the protection switching screen by entering:<br>**pr**↵<br>*The protection switching screen appears.* |
| **2** | Display the timing Reference Protection screen by entering:<br>**trefprot**↵<br>*The screen displays the protection status.* |
| **3** | After reviewing the Reference Protection screen, return to the Network Element Status screen by entering:<br>**quit**↵ |

<div align="center">**—end—**</div>

## Procedure 2-22
# Disabling or enabling the exerciser on tributary and transport optics

Use this procedure to disable or enable the exerciser on the OC-3 or OC-12 circuit pack protection groups.

*Note:* This procedure is not valid for OC-12 virtual tributary bandwidth manager (VTBM [NT7E05]) optical interface circuit packs.

## Action

| Step | Action |
|------|--------|
| 1 | From the Network Element Status screen, display the protection switching screen by entering: |
| | **pr**↵ |
| | *The protection switching screen appears.* |
| 2 | Display the detailed Protection screen by entering: |
| | **dtlprot  <type> [<unit>]**↵ |
| | where |
| | <type>   type of circuit pack group: **oc3** or **oc12** |
| | <unit>   See "Group and slot associations for DS1, DS3, STS-1, OC-3, and OC-12" on page 2-2. |
| | *The detailed Protection screen appears.* |
| 3 | Display the Protection Provisioning screen by entering: |
| | **protprov**↵ |
| | *The Protection Provisioning screen appears.* |
| 4 | Change the exerciser by entering: |
| | **protexer <exerciser>**↵ |
| | where |
| | <exerciser>   **disabled** (to inhibit the exerciser) |
| | **enabled** (to restore the exerciser) |
| | *The Protection Provisioning screen appears when you disable the exerciser.* |
| 5 | After completing the Protection Provisioning screen, return to the Network Element Status screen by entering: |
| 6 | **quit**↵ |
| | —end— |

# Protection-switching procedures at the OPC (OC-12 rings only)

This chapter contains procedures for protection switching. These procedures are performed from the Network Summary tool, part of the Network Surveillance toolset, and the Connection Manager tool, part of the Network Admin toolset. The Connection Manager tool allows you to operate or release a forced protection switch for a synchronous transport signal (STS) connection.

In addition to protection switching, the Network Summary tool has alarm-monitoring capabilities. For a detailed description of the Network Summary tool (both its protection-switching and alarm-monitoring capabilities) and the Connection Manager tool, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration and Provisioning, Volume 4A*.

Protection switching for the add-drop multiplexer (ADM) nodes of an OC-12 ring can be done from a single site, using the operations controller (OPC), rather than logging in to each node individually through the network element user interface.

The Network Summary tool contains the protection-switching features of the OPC. A dialog in the Network Summary tool:

• lists all ADMs in a ring configuration

• supplies the protection-switching status for those ADM nodes within the OPC span of control

Protection-switching status and commands are available only for ADMs in the current OPC span of control. The status is not shown for ADMs outside the current span of control or for those ADMs that have lost communication with the OPC. You can use the OPC protection-switching commands on an optical circuit-pack-group (CPG) to:

• initiate forced and manual protection switches

• operate or release a lockout of working or protection channels

• schedule the protection exerciser for the ADM nodes

For protection-switching commands for a point-to-point or single-ended application, you must use the protection-switching commands in the network element user interface, as described in Chapter 2 of this document, "Protection switching."

## Chapter task list

Specific provisioning tasks allow you to change the default values assigned by the system during initial installation of the equipment. For lists of these required provisioning tasks, refer to "Overview of protection switching" on page 1-1.

This chapter includes the following tasks. They can be performed at any time and in any order.

| Procedure | Task | See |
|---|---|---|
| 3-1 | Displaying the protection status of a ring | page 3-3 |
| 3-2 | Operating or releasing a lockout | page 3-4 |
| 3-3 | Operating or releasing a forced protection switch | page 3-8 |
| 3-4 | Operating or releasing a manual protection switch | page 3-11 |
| 3-5 | Running the exerciser for all ADMs in a ring | page 3-13 |
| 3-6 | Running the exerciser for a single ADM | page 3-14 |
| 3-7 | Scheduling the exerciser for all ADMs in a ring | page 3-16 |
| 3-8 | Scheduling the exerciser for a single ADM | page 3-19 |

## Requirements for the procedure

Before starting any of the procedures in this chapter, you must do the following:

- Have a userID and password that allow you to access the OPC and the Network Summary tool.

- Know how to work with the command conventions for the type of interface, either character-mode or graphical, that you are using.

  *Note:* For a reminder of how to use the interface, see *OPC User Interface Description*, 323-3001-301, in *Operations, Administration, and Provisioning*, Volume 4A.

# Procedure 3-1
# **Displaying the protection status of a ring**

Use this procedure to display the protection status of all add-drop multiplexers (ADMs) in a ring at the same time.

Using this procedure, you can identify the following information:

- the status of OC-12 circuit pack groups (CPGs) at each ADM in the operations controller (OPC) span of control
- whether CPGs are protected
- whether the exerciser is in progress

| Step | Action |
| --- | --- |

**1**      Log in to the OPC and open the Network Summary tool.

*The Network Summary main window appears. It shows alarm and protection switch totals for all the network elements in the OPC span of control.*

**2**      To display the Protection menu, press **Ctrl_L T** (or Keypad **,**).

*The Protection menu appears.*

**3**      Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**).

*The Protection details dialog appears, showing all add-drop multiplexers (ADMs) in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.*

**4**      Tab to the Done button then press **Ctrl_A** (or Keypad **0**).

*The Network Summary main window appears.*

**5**      To close the Network Summary Tool, press **Esc** or complete the instructions in the following table:

| To | Press |
| --- | --- |
| display the window menu | **Ctrl_L** (or Keypad **6**)<br>*The window menu appears.* |
| exit | **Space** (or Keypad **0**)<br>*The User Session Manager appears.* |

**—end—**

## Procedure 3-2
# Operating or releasing a lockout

Use this procedure to operate or release a lockout on a selected ring. A lockout disables protection switching, which prevents switching from a working circuit pack to a protection circuit pack. A lockout is the highest-priority switching function and overrides forced, manual, and automatic protection switches.

> ⚠️ **CAUTION**
> **Risk of traffic loss**
> Operating a lockout prevents protection switching in the ring and can result in traffic loss.

This procedure can also be performed at the network element user interface.

*Note:* In a virtual tributary bandwidth manager (VTBM) ring, operating a lockout of protection command on any span in the ring locks out all protection for the entire ring including the span that has the active lockout protection switch.

**Action**

| Step | Action |
|------|--------|
| 1 | Log in to the OPC and open the Network Summary tool. <br> *The Network Summary main window appears.* |
| 2 | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). <br> *The Protection menu appears.* |
| 3 | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). <br> *The Protection details dialog appears, showing all add-drop multiplexers (ADMs) in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| 4 | Tab to the Ring ADM list. |
| 5 | Use the arrow keys to move to the circuit pack group (CPG) where you want to operate or release a lockout of either the working or the protection channels. |
| 6 | Press **Ctrl_L** (or Keypad **Enter**) to display the list item menu. <br> *The list item menu appears.* |

<div align="center">—continued—</div>

Procedure 3-2 (continued)
**Operating or releasing a lockout**

| Step | Action |
|------|--------|

**7**     Complete the instructions in the following table depending on the channel
type:

| To operate or release a lockout of the | Complete the following |
|---|---|
| working channels | Press the right arrow key.<br>*A cascade menu appears with the Operate and Release commands.* |
| protection channels | Press the down arrow key to move to the Lockout Protection command.<br><br>Press the right arrow key.<br><br>*A cascade menu appears with the Operate and Release commands.* |

**8**     Complete the instructions in the following table to select a command.

| If you want to select this command | Then press |
|---|---|
| Operate | **Space** (or Keypad **0**) |
| Release | The down arrow key<br>**Space** or (Keypad **0**) |

*A confirmation dialog appears, prompting you to confirm your request.*

**—continued—**

Procedure 3-2 (continued)
**Operating or releasing a lockout**

| Step | Action |
|------|--------|

**9**  Tab to the Yes button, the press **Ctrl_A** (or Keypad **0**).

| If you are performing this command | For this channel | Then this response happens |
|-----------------------------------|------------------|----------------------------|
| Operate | working | The selected working channels are locked out, and the Protection details dialog appears. The Protection details dialog displays an asterisk (*) in the LcktW column of the selected network element and displays another asterisk for the corresponding network element at the other end of the route. |
| Release | working | The selected working channels are available again, and the Protection details dialog appears. |
| Operate | protection | The Protection details dialog appears. The selected protection channels are locked out, and traffic using the protection channels switches to the working channels.<br><br>The Protection Details dialog displays an asterisk (*) in the LcktP column of the selected network element and displays another asterisk for the corresponding network element at the other end of the route. |
| Release | protection | The selected protection channels are available again, and the Protection details dialog appears. |

**—continued—**

Procedure 3-2 (continued)
**Operating or releasing a lockout**

| Step | Action |
|------|--------|
| **10** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
|  | *The Network Summary main window appears.* |
| **11** | To close the Network Summary Tool, press **Esc** or complete the instructions in the following table: |

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**)<br>*The window menu appears.* |
| exit | **Space** (or Keypad **0**)<br>*The User Session Manager appears.* |

—**end**—

## Procedure 3-3
# Operating or releasing a forced protection switch

Use this procedure to operate or release a forced protection switch on a ring. This procedure redirects add/drop traffic on the working time slots (1 to 6) to the protection time slots (7 to 12) on the protecting circuit pack group (CPG). The protection time slots on the protecting CPG receive the pass-through traffic, which then loops back to the corresponding working time slots.

A forced protection switch has a higher priority than a manual protection switch or an automatic protection switch. It has a lower priority than a lockout.

This procedure can also be performed at the network element user interface.

> **CAUTION**
> **Risk of traffic loss**
> The operations controller (OPC) allows you to operate more than one forced protection switch in a ring. However, this causes the ring to be segmented, and traffic might be lost.

## Action

| Step | Action |
|------|--------|
| **1** | Log in to the OPC and open the Network Summary tool. *The Network Summary main window appears.* |
| **2** | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). *The Protection menu appears.* |
| **3** | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). *The Protection details dialog appears, showing all add-drop multiplexers (ADMs) in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| **4** | Tab to the Ring ADM list. |
| **5** | Press the arrow keys to move to the CPG where you want to operate or release a forced protection switch. |
| **6** | To display the list item menu, press **Ctrl_L** (or Keypad **Enter**). *The list item menu appears.* |
| **7** | To move to the Forced switch command, press the arrow keys. *A cascade menu displays the Operate and Release commands.* |

—**continued**—

Procedure 3-3 (continued)
**Operating or releasing a forced protection switch**

| Step | Action |
|---|---|

**8**   To move to the cascade menu, press the right arrow key.

| If you want to select this command | Then press |
|---|---|
| Operate | **Space** (or Keypad **0**) |
| Release | The down arrow key<br>**Space** (or Keypad **0**) |

*A confirmation dialog appears, prompting you to confirm your request.*

**9**   Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).

**10**   Review the responses in the following table and complete the actions for the command you are performing.

| Command | Response | Action |
|---|---|---|
| Operate | *A warning dialog appears.* | Tab to the Yes button, then press **Ctrl-A** (or Keypad **0**).<br><br>*The Protection details dialog displays an asterisk (\*) in the Forced column of the selected network element and displays an asterisk for the corresponding network element at the other end of the route. Traffic switches from the working time slots to the protection time slots.* |
| Release | *The Protection details dialog appears. Traffic switches from the protection time slots to the working time slots.* | None |

**—continued—**

Procedure 3-3 (continued)
**Operating or releasing a forced protection switch**

| Step | Action |
|------|--------|
| **11** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
|  | *The Network Summary main window appears.* |
| **12** | To close the Network Summary Tool, press **Esc** or complete the instructions in the following table: |

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**)<br>*The window menu appears.* |
| exit | **Space** (or Keypad **0**)<br>*The User Session Manager appears.* |

—**end**—

Procedure 3-4
# Operating or releasing a manual protection switch

Use this procedure to operate or release a manual protection switch. A manual protection switch has a lower priority than an automatic protection switch, a forced protection switch, and a lockout.

This procedure can also be performed at the network element user interface.

## Action

| Step | Action |
|------|--------|
| **1** | Log in to the OPC and open the Network Summary tool. |
| | *The Network Summary main window appears.* |
| **2** | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). |
| | *The Protection menu appears.* |
| **3** | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). |
| | *The Protection details dialog appears, showing all add-drop multiplexers (ADMs) in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they also appear in the list.* |
| **4** | Tab to the Ring ADM list. |
| **5** | Use the arrow keys to move to the circuit pack group (CPG) where you want to operate or release a manual protection switch. |
| **6** | To display the list item menu, press **Ctrl_L** (or Keypad **Enter**). |
| | *The list item menu appears.* |
| **7** | To move to the Manual switch command, press the arrow keys. |
| | *A cascade menu appears with the Operate and Release commands.* |
| **8** | To move to the cascade menu, press the right arrow key. |

| If you want to select this command | Then press |
|------------------------------------|------------|
| Operate | **Space** (or Keypad **0**) |
| Release | The down arrow key<br>**Space** (or Keypad **0**) |

*A confirmation dialog appears, prompting you to confirm your request.*

—**continued**—

Procedure 3-4 (continued)
**Operating or releasing a manual protection switch**

| Step | Action |
|------|--------|

9       Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**).

| If you are performing this command | Then this response happens |
|-----------------------------------|----------------------------|
| Operate | The Protection details dialog appears. Traffic switches from the working time slots to the protection time slots. |
| | The Protection details dialog displays an asterisk (*) in the Man column of the selected network element and displays another asterisk for the corresponding network element at the other end of the route. |
| Release | The selected time slots are available again, and the Protection details dialog appears. |

10      Tab to the Done button, then press **Ctrl_A** (or Keypad **0**).

*The Network Summary main window appears.*

11      To close the Network Summary Tool, press **Esc** or complete the instructions in the following table:

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**) |
| | *The window menu appears.* |
| exit | **Space** (or Keypad **0**) |
| | *The User Session Manager appears.* |

—**end**—

## Procedure 3-5
# Running the exerciser for all ADMs in a ring

Use this procedure to run the exerciser immediately for all add-drop multiplexers (ADM) in a ring. The network element equipment logs display the results of the exerciser.

## Action

| Step | Action |
|------|--------|
| **1** | Log in to the OPC and open the Network Summary tool. |
| | *The Network Summary main window appears.* |
| **2** | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). |
| | *The Protection menu appears.* |
| **3** | Use the arrow keys to move to the required ring name, the press **Space** (or Keypad **0**). |
| | *The Protection details dialog appears, showing all ADMs in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| **4** | Tab to the Ring ADM list. |
| **5** | To display the list menu, press **Ctrl_L /** (or Keypad **3**). |
| | *The list menu appears.* |
| **6** | Use the arrow keys to move to the Exercise all immediately command, then press **Space** (or Keypad **0**). |
| | *A confirmation dialog appears, prompting you to confirm your request.* |
| **7** | Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**). |
| | *The Protection Details dialog appears. The Excsr column indicates that the exerciser is On (that is, in progress) for the ADMs in the ring.* |
| **8** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
| | *The Network Summary main window appears.* |
| **9** | To close the Network Summary Tool, press **Esc** or complete the instructions in the following table: |

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**) |
| | *The window menu appears.* |
| exit | **Space** (or Keypad **0**) |
| | *The User Session Manager appears.* |

**—end—**

Procedure 3-6
# Running the exerciser for a single ADM

Use this procedure to run the exerciser immediately for a single add-drop multiplexer (ADM) in a ring configuration. The network element equipment logs display the results of the exerciser.

## Action

| Step | Action |
|------|--------|
| 1 | Log in to the OPC and open the Network Summary tool. |
|  | *The Network Summary main window appears.* |
| 2 | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). |
|  | *The Protection menu appears.* |
| 3 | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). |
|  | *The Protection details dialog appears, showing all ADMs in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| 4 | Tab to the Ring ADM list, then use the arrow keys to move the ADM where you want to run the exerciser. |
| 5 | To display the list item menu, press **Ctrl_L** (or Keypad **Enter**). |
|  | *The list item menu appears.* |
| 6 | Use the arrow keys to move to the Exercise immediately command, then press **Space** (or Keypad **0**). |
|  | *A confirmation dialog appears, prompting you to confirm your request.* |
| 7 | Tab to the Yes button, then press **Ctrl_A** (or Keypad **0**). |
|  | *The Protection Details dialog appears. The Excsr column indicates that the exerciser is On (that is, in progress) for the selected ADM.* |
| 8 | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
|  | *The Network Summary main window appears.* |

<div align="center">**—continued—**</div>

Procedure 3-6 (continued)
**Running the exerciser for a single ADM**

| Step | Action |
|------|--------|

**9**     To close the Network Summary Tool, press **Esc** or complete the instructions in the following table:

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**) <br> *The window menu appears.* |
| exit | **Space** (or Keypad **0**) <br> *The User Session Manager appears.* |

—**end**—

## Procedure 3-7
# Scheduling the exerciser for all ADMs in a ring

Use this procedure to schedule the exerciser for all add-drop multiplexers (ADMs) in a ring.

## Action

| Step | Action |
|------|--------|
| **1** | Log in to the OPC and open the Network Summary tool. |
| | *The Network Summary main window appears.* |
| **2** | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). |
| | *The Protection menu appears.* |
| **3** | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). |
| | *The Protection details dialog appears, showing all ADMs in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| **4** | Tab to the Ring ADM list. |
| **5** | To display the list menu, press **Ctrl_L /** (or Keypad **3**). |
| | *The list menu appears.* |
| **6** | To select the Schedule exercisers command, press **Space** (or Keypad **0**). |
| | *The Exerciser Schedule List dialog appears.* |
| **7** | Tab to the Ring ADM list. |
| **8** | To display the list menu, press **Ctrl_L /** (or Keypad **3**). |
| | *The list menu appears.* |
| **9** | To select the Schedule all command, press **Space** (or Keypad **0**). |
| | *A Warning dialog appears, informing you that this command changes the schedule for every ADM in the ring configuration.* |
| **10** | To select the OK button, press **Ctrl_A** (or Keypad **0**). |
| | *The Scheduler dialog appears.* |
| **11** | Tab to the Start time field, then type the time you want the exerciser to start. |
| | ***Note:*** Enter all times in hours and minutes using the 24-hour format. Type a colon (:) between the hours and the minutes as shown in the following example: 13:30. |
| **12** | Tab to the Start date field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu. |

—**continued**—

Procedure 3-7 (continued)
**Scheduling the exerciser for all ADMs in a ring**

| Step | Action |
|------|--------|
| **13** | Use the arrow keys to move to either today or tomorrow, then press **Space** (or Keypad **0**) to select it. |

> *Note:* The only valid dates are today's date and tomorrow's date. Any other date is rejected.

**14**   Complete the instructions in the following table to set an end time and date for the exerciser or to run the exerciser continually.

*Note:* If you run the exerciser continually, you do not set an end time and date.

| If you want to | Then |
|----------------|------|
| specify an end time and date | Type to the End time field, then type the time you want the exerciser to end. |
| | Tab to the End date field, then type the date you want the exerciser to end. |
| | *Note:* Type the date in the format dd/mm/yyyy. Remember to type a slash between the day, month, and year. |
| run the exerciser continually | Tab to the "and repeat every" field, then enter how often you want the exerciser to run. |
| | The following chart shows the valid ranges for the units (days, hours, minutes, or seconds). |

| If you select | Then the valid range is |
|---------------|-------------------------|
| days | 1 to 730 |
| hours | 1 to 17543 |
| minutes | 60 to 32767 |
| seconds | 3600 to 32767 |

Tab to the "and repeat every" unit field, then press **Ctrl_L/** (or Keypad **3**) to display the chooser menu.

*The chooser menu appears.*

Use the arrow keys to move to the required unit (days, hours, minutes, or seconds), then press **Space** (or Keypad **0**).

**15**   Tab to the Offset buttons.

—**continued**—

Procedure 3-7 (continued)
**Scheduling the exerciser for all ADMs in a ring**

| Step | Action |
|------|--------|
| **16** | Use the arrow keys to move to the desired offset time. |
| | The default offset is one minute, which is the recommended offset. To select a different offset, press **Ctrl_A** (or Keypad **0**) to select the button corresponding to that time. |
| | *A black diamond appears beside the selected offset button.* |
| **17** | Tab to the OK button, the press **Ctrl_A** (or Keypad **0**) to select it. |
| | *The Exerciser Schedule List dialog appears. The schedule is updated with the information you entered in the Scheduler dialog, and the exerciser runs according to the new specifications.* |
| **18** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
| | *The Protection details dialog appears.* |
| **19** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |
| | *The Network Summary main window appears.* |
| **20** | To close the Network Summary Tool, press **Esc** or complete the instructions in the following table: |

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**) |
| | *The window menu appears.* |
| exit | **Space** (or Keypad **0**) |
| | *The User Session Manager appears.* |

**—end—**

Procedure 3-8
# Scheduling the exerciser for a single ADM

Use this procedure to schedule the exerciser for a single add-drop multiplexer (ADM).

## Action

| Step | Action |
| --- | --- |
| **1** | Log in to the OPC and open the Network Summary tool. |
| | *The Network Summary main window appears.* |
| **2** | To display the Protection menu, press **Ctrl_L T** (or Keypad **,**). |
| | *The Protection menu appears.* |
| **3** | Use the arrow keys to move to the required ring name, then press **Space** (or Keypad **0**). |
| | *The Protection details dialog appears, showing all ADMs in the selected ring configuration. If the ring contains ADMs from another OPC span of control, they are also shown in the list.* |
| **4** | Tab to the Ring ADM list. |
| **5** | To display the list menu, press **Ctrl_L /** (or Keypad **0**). |
| | *The list menu appears.* |
| **6** | To select the Schedule exercisers command, press **Space** (or Keypad **0**). |
| | *The Exerciser Schedule List dialog appears.* |
| **7** | Tab to the Ring ADM list, then use the arrow keys to move to the ADM where you want to schedule the exerciser. |
| **8** | To display the list item menu, press **Ctrl_L** (or Keypad **Enter**). |
| | *The list item menu appears.* |
| **9** | To select the Edit schedule command, press **Space** (or Keypad **0**). |
| | *The Scheduler dialog appears.* |
| **10** | Tab to the Start time field, then type the time you want the exerciser to start. |
| | ***Note:*** Enter all times in hours and minutes using the 24-hour format. Type a colon (:) between the hours and the minutes as shown in the following example: 13:30. |
| **11** | Tab to the Start date field, then press **Ctrl_L /** (or Keypad **3**) to display the chooser menu. |
| **12** | Use the arrow keys to move to either today or tomorrow, then press **Space** (or Keypad **0**). |
| | ***Note:*** The only valid dates are today's date and tomorrow's date. Any other date is rejected. |

—**continued**—

Procedure 3-8 (continued)
**Scheduling the exerciser for a single ADM**

| Step | Action |
|------|--------|
| **13** | Complete the instructions in the following table to set an end time and date for the exerciser or to run the exerciser continually. |

*Note:* If you run the exerciser continually, you do not set an end time and date.

| If you want to | Then |
|----------------|------|
| specify an end time and date | Tab to the End time field, then type the time you want the exerciser to end. |
| | Tab to the End date field, then type the date you want the exerciser to end. |
| | *Note:* Type the date in the format dd/mm/yyyy. Remember to type a slash between the day, month, and year. |
| run the exerciser continually | Tab to the "and repeat every" field, then enter how often you want the exerciser to run. |
| | The following chart shows the valid ranges for the units (days, hours, minutes, or seconds). |

| If you select | Then the valid range is |
|---------------|-------------------------|
| days | 1 to 730 |
| hours | 1 to 17543 |
| minutes | 60 to 32767 |
| seconds | 3600 to 32767 |

Tab to the "and repeat every" unit field, then press **Ctrl_L/** (or Keypad **3**) to display the chooser menu.

*The chooser menu appears.*

Use the arrow keys to move to the required unit (days, hours, minutes, or seconds), then press **Space** (or Keypad **0**).

| | |
|------|--------|
| **14** | Tab to the OK button, the press **Ctrl_A** (or Keypad **0**). |

*The Exerciser Schedule List dialog appears. The schedule for the selected ADM is updated with the information you entered in the Scheduler dialog. The exerciser runs for the selected ADM according to the new specifications.*

| | |
|------|--------|
| **15** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**). |

*The Protection Details dialog appears.*

—**continued**—

Procedure 3-8 (continued)
**Scheduling the exerciser for a single ADM**

| Step | Action |
|------|--------|
| **16** | Tab to the Done button, then press **Ctrl_A** (or Keypad **0**).<br>*The Network Summary main window appears.* |
| **17** | To close the Network Summary Tool, press **Esc** or complete the instructions in the following table: |

| To | Press |
|----|-------|
| display the window menu | **Ctrl_L** (or Keypad **6**)<br>*The window menu appears.* |
| exit | **Space** (or Keypad **0**)<br>*The User Session Manager appears.* |

—**end**—

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