CHAPTER 14

Upgrade Cards and Spans

This chapter explains how to upgrade common control cards, DS3-12 and DS3N-12 cards, and optical spans for the Cisco ONS 15454.

Note The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

Before You Begin

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. NTP-A92 Upgrade the XC Card to the XCVT Card, page 14-2—Complete as needed.
2. NTP-A220 Upgrade the XC or XCVT Card to the XC10G Card, page 14-3—Complete as needed
3. NTP-A93 Upgrade the DS3-12 Card to the DS3-12E Card, page 14-4—Complete as needed.
4. NTP-A153 Upgrade the AIC Card to AIC-I, page 14-8—Complete as needed.
5. NTP-A94 Upgrade OC-N Cards and Spans Automatically, page 14-8—Complete this procedure as needed to upgrade OC-N cards within path protection configurations, BLSRs, and 1+1 protection groups.
6. NTP-A95 Upgrade OC-N Spans Manually, page 14-11—Complete this procedure as needed to perform error recovery for the Span Upgrade Wizard or back out of a span upgrade (downgrade).

NTP-A92 Upgrade the XC Card to the XCVT Card

Purpose	This procedure upgrades the XC card to the XCVT card.
Tools/Equipment	Two XCVT cards
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

Note The UNEQ-P alarm is raised during a cross-connect card upgrade if you have E100T-12/E1000-2 cards installed in the node. The alarm will clear within a few seconds.

Caution Always upgrade the standby cross-connect card. Removing an active cross-connect card can cause a protection switch unless a lockout is in place. If the standby card is being upgraded, a lockout is unnecessary.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 3-24 at the node where you will perform the upgrade. If you are already logged in, continue with Step 2.

Step 2 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 3 Determine the standby XC card. The ACT/STBY LED of the standby XC card is amber, while the ACT/STBY LED of the active XC card is green.

Step 4 Physically replace the standby XC card with an XCVT card:

a. Open the XC card ejectors.

b. Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the upgrade is complete.

c. Open the ejectors on the XCVT card.

d. Slide the XCVT card into the slot along the guide rails.

e. Close the ejectors.

On the XCVT card the FAIL LED above the ACT/STBY LED becomes red, blinks for several seconds, and turns off. The amber ACT/STBY LED turns on.

Step 5 In node view, click the **Maintenance > Cross-Connect** tabs.

Step 6 From the Cross Connect Cards menu, choose **Switch**.

Step 7 Click **Yes** on the Confirm Switch dialog box. Traffic switches to the XCVT card inserted in Step 4. The ACT/STBY LED on this card changes from amber to green.

Note The Interconnection Equipment Failure alarm appears, but it will clear when the upgrade procedure is complete and the node has matching cross-connect cards installed.

Step 8 Physically remove the now standby XC card from the shelf and insert the second XCVT card into the empty XC slot:

a. Open the XC card ejectors.

b. Slide the XC card out of the slot.

c. Open the ejectors on the XCVT.

d. Slide the XCVT card into the slot along the guide rails.

e. Close the ejectors.

The upgrade is complete when the second XCVT card boots up and becomes the standby XCVT.

Stop. You have completed this procedure.

NTP-A220 Upgrade the XC or XCVT Card to the XC10G Card

Purpose	This procedure upgrades an XC or XCVT card to an XC10G card.
Tools/Equipment	Two XC10G cards
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

Note This procedure only applies to the XC or XCVT cards that are installed in the 15454-SA-ANSI or the 15454-SA-HD. You cannot perform this upgrade from shelves released prior to Software R3.1. The XC10G requires the 15454-SA-ANSI or the 15454-SA-HD.

Note The UNEQ-P alarm is raised during a cross-connect card upgrade if you have E100T-12/E1000-2 cards installed in the node. The alarm will clear within a few seconds.

Note Downgrade procedures from XC10G cards to XCVT or XC cards are not supported. Contact Cisco Technical Assistance Center (TAC) for more information see the "Obtaining Technical Assistance" section on page lviii.

Caution Always upgrade the standby cross-connect card. Removing an active cross-connect card can cause a protection switch unless a lockout is in place. If the standby card is being upgraded, a lockout is unnecessary.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 3-24 at the node where you will perform the upgrade. If you are already logged in, continue with Step 2.

Step 2 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 3 Determine the standby XC or XCVT card. The ACT/STBY LED of the standby XC or XCVT card is amber, while the ACT/STBY LED of the active XC or XCVT card is green.

Step 4 Physically replace the standby XC or XCVT card on the ONS 15454 with an XC10G card:

- **a.** Open the XC or XCVT card ejectors.
- **b.** Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the upgrade is complete.
- **c.** Open the ejectors on the XC10G card.
- **d.** Slide the XC10G card into the slot along the guide rails.
- **e.** Close the ejectors.

Note On the XC10G card the fail LED above the ACT/STBY LED becomes red, blinks for several seconds, and turns off. The ACT/STBY LED turns amber and remains on. In node view, the XC10G appears as the standby XC or XCVT.

Step 5 In node view, click the **Maintenance > Cross-Connect** tabs.

Step 6 From the Cross Connect Cards menu, choose **Switch**.

Step 7 Click **Yes** on the Confirm Switch dialog box. Traffic switches to the XC10G card you inserted in Step 4. The ACT/STBY LED on this card changes from amber to green.

Note The Interconnection Equipment Failure alarm appears, but it will clear when the upgrade procedure is complete and the node has matching cross-connect cards installed.

Step 8 Physically remove the now standby XC or XCVT card from the ONS 15454 and insert the second XC10G card into the empty XC or XCVT card slot:

- **a.** Open the XC or XCVT card ejectors.
- **b.** Slide the XC or XCVT card out of the slot.
- **c.** Open the ejectors on the XC10G card.
- **d.** Slide the XC10G card into the slot along the guide rails.
- **e.** Close the ejectors.

The upgrade is complete when the second XC10G card boots up and becomes the standby XC10G card. In node view, both the active and standby cards will change to XC10G.

Stop. You have completed this procedure.

NTP-A93 Upgrade the DS3-12 Card to the DS3-12E Card

Purpose	This procedure upgrades the DS3-12 card to the DS3-12E card or the DS3N-12 card to the DS3N-12E card. This procedure can also be used to enable the capabilities of a DS3-12E card that was installed in a shelf with Software R3.1 or earlier.
Tools/Equipment	DS3-12E or DS3N-12E card

Prerequisite Procedures	NTP-A17 Install the Electrical Cards, page 2-16
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Note Upgrades must be performed between two N-type cards or two non-N-type cards. You cannot upgrade between an N-type card and a non-N-type card. When physically replacing a card, the new card must be in the same slot as the old card. The DS3-12E card upgrade supports 1:1 and 1:N protection schemes. The procedure is non-service affecting for protected cards; that is, the upgrade will cause a switch less than 50 ms in duration.

Caution Protect cards must be upgraded before working cards because working cards cannot have more capabilities than their protect card.

Note During the upgrade some minor alarms and conditions appear and then clear on their own; however, there should be no Service-Affecting (SA, Major, or Critical) alarms if you are upgrading protected cards. (Upgrading an unprotected card can be service affecting.) If any service-affecting alarms occur, Cisco recommends backing out of the procedure. See the "NTP-A254 Downgrade a DS3-12E/DS3NE Card to a DS3-12/DS3N-12 Card" procedure on page 14-6.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 3-24. If you are already logged in, continue with Step 2.

Step 2 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 3 Determine if the card you are upgrading is protected or unprotected:

a. A protected card will be listed under Protection Groups in the **Maintenance > Protection** tabs. The slot, port, and status (that is, Protect/Standby, Working/Active) of each card will be listed in the Selected Group.

b. An unprotected card will not be listed in the Protection Groups/Selected Group in the **Maintenance > Protection** tabs.

Caution Traffic will be lost during an upgrade on an unprotected card.

Step 4 If the card you are upgrading is unprotected, skip this step and go to Step 5 and ignore references to the protect card and protect slot. If the card you are upgrading is protected, make sure the protect card is not active. If the card status is Protect/Active, perform a switch so that the working card becomes active:

a. Double-click the protection group.

b. Click the Protect/Active card.

c. Click **Switch.**

d. Click **Yes** in the confirmation dialog box.

Step 5 Physically remove the protect DS3-12 or the protect DS3N-12 card:

a. Open the DS3-12 or DS3N-12 card ejectors.

b. Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the upgrade is complete.

Step 6 Right-click the protect slot and choose **Change Card** from the drop-down menu.

Step 7 Choose the new card (DS3-12E or DS3N-12E) from the Change to: drop-down menu.

Step 8 Click **OK**.

Step 9 Insert the new DS3-12E or DS3N-12E card into the protect slot:

a. Open the ejectors on the DS3-12E or DS3N-12E card.

b. Slide the DS3-12E or DS3N-12E card into the slot along the guide rails.

Step 10 Close the ejectors.

Wait for the IMPROPRMVL alarm to clear and the card to become standby.

Step 11 If you switched traffic in Step 4, clear the switch:

a. In the **Maintenance > Protection** tabs, double-click the protection group that contains the reporting card.

b. Click the selected group.

c. Click **Clear** and click **Yes** at the confirmation dialog box.

Step 12 Repeat Steps 3 through 11 for the working card.

Stop. You have completed this procedure.

NTP-A254 Downgrade a DS3-12E/DS3NE Card to a DS3-12/DS3N-12 Card

Purpose	This task downgrades a DS3-12E or DS3NE card. Downgrading can be performed to back out of an upgrade.The procedure for downgrading is the same as upgrading except you choose DS3-12 or DS3N-12 from the Change Card drop-down menu.
Tools	None
Prerequisite Procedures	NTP-A17 Install the Electrical Cards, page 2-16
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Note All ports must be provisioned as UNFRAMED and have Path Trace disabled.

Note Working cards must be downgraded before protect cards.

Tip The procedure for downgrading is the same as upgrading except you choose DS3-12 or DS3N-12 from the Change Card drop-down menu.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 3-24. If you are already logged in, continue with Step 2.

Step 2 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 3 Determine if the card you are downgrading is protected or unprotected:

a. A protected card will be listed in the Protection Groups area on the **Maintenance > Protection** tabs. The slot, port, and status (that is, Protect/Standby, Working/Active) of each card will be listed under Selected Group.

b. An unprotected card will not be listed under Protection Groups/Selected Group in the **Maintenance > Protection** tabs.

Caution Traffic will be lost during an upgrade on an unprotected card.

Step 4 If the card you are upgrading is unprotected, skip this step and go to Step 5 and ignore references to the protect card and protect slot. If the card you are upgrading is protected, make sure the protect card is not active. If the card status is Protect/Active, perform a switch so that the working card becomes active:

a. Double-click the protection group.

b. Click the Protect/Active card.

c. Click **Switch** and **Yes** in the Confirmation dialog box.

Step 5 Physically remove the working DS3-12E card or the working DS3N-12E card:

a. Open the DS3-12E or DS3N-12E card ejectors.

b. Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the downgrade is complete.

Step 6 Right-click the slot to be downgraded and choose **Change Card** from the drop-down menu.

Step 7 Choose **DS3-12** or **DS3N-12** from the Change to: drop-down menu.

Step 8 Click **OK**.

Step 9 Insert the DS3-12 or DS3N-12 card into the working slot:

a. Open the ejectors on the DS3-12 or DS3N-12 card.

b. Slide the DS3-12 or DS3N-12 card into the slot along the guide rails.

Step 10 Close the ejectors. Wait for the IMPROPRMVL alarm to clear and the card to become active.

Step 11 If you switched traffic in Step 4, clear the switch:

a. In the **Maintenance > Protection** tabs, double-click the protection group that contains the reporting card.

b. Click the selected group.

c. Click **Clear** and click **Yes** in the confirmation dialog box.

Step 12 Repeat Steps 3 through 11 to downgrade the protect card if applicable.

Stop. You have completed this procedure.

NTP-A153 Upgrade the AIC Card to AIC-I

Purpose	This procedure upgrades an AIC card to an AIC-I card; the AIC-I card provides additional alarm contacts.
Tools	None
Prerequisite Procedures	DLP-A38 Install the Alarm Interface Controller or Alarm Interface Controller–International Card, page 2-11
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

Step 1 Physically remove the AIC card:

a. Open the AIC card ejectors.

b. Slide the card out of the slot.

After several seconds this raises the IMPROPRMVL alarm, which will clear when the downgrade is complete.

Step 2 Complete the "DLP-A38 Install the Alarm Interface Controller or Alarm Interface Controller–International Card" task on page 2-11.

Step 3 Complete the "NTP-A258 Provision External Alarms and Controls on the Alarm Interface Controller-International" procedure on page 9-39.

Stop. You have completed this procedure.

NTP-A94 Upgrade OC-N Cards and Spans Automatically

Purpose	This procedure upgrades cards, two-fiber BLSR spans, four-fiber BLSR spans, path protection spans, and 1+1 protection group spans. The Span Upgrade Wizard only supports OC-N span upgrades. It does not support electrical upgrades.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade (for example, XC10G cards and OC-48 any slot cards) Attenuators might be needed for some applications
Prerequisite Procedures	The span upgrade procedure requires at least two technicians (one at each end of the span) who can communicate with each other during the upgrade.
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Do not perform any other maintenance operations, such as facility or terminal loopbacks, or add any circuits during a card or span upgrade.

Note OC-N transmit and receive levels should be in their acceptable range as shown in the specifications for each card in the "NTP-A247 Install Fiber-Optic Cables on OC-N Cards" procedure on page 2-29.

Note During the upgrade, the IMPROPRMVL alarm may be raised. It will clear automatically.

Note A four-port OC-3 to eight-port OC-3 upgrade, or an OC-12 to four-port OC-12 upgrade can only be performed from multispeed slots (Slots 1 to 4 and 14 to 17) because the OC3-8 and OC12-4 card can only be installed in multispeed slots. Ensure that the OC-3 and OC-12 cards are in multispeed slots before performing a span upgrade to the OC3-8 and OC12-4. The four OC-3 ports will be mapped to Ports 1 to 4 on the eight-port OC-3 card. The OC-12 port will be mapped to Port 1 on the four-port OC-12 card.

Note BLSR protection channel access (PCA) circuits, if present, will remain in their existing STSs. Therefore, they will be located on the working path of the upgraded span and will have full BLSR protection. To route PCA circuits on protection channels in the upgraded span, delete and recreate the circuits after the span upgrade. For example, if you upgrade an OC-48 span to an OC-192, PCA circuits on the protection STSs (STSs 25 to 48) in the OC-48 BLSR will remain in their existing STSs (STSs 25 to 48) which are working, protected STSs in the OC-192 BLSR. Deleting and recreating the OC-48 PCA circuits moves the circuits to STSs 96 to 192 in the OC-192 BLSR. To delete circuits, see the "NTP-A278 Modify and Delete Overhead Circuits" procedure on page 11-19. To create circuits, see Chapter 8, "Create Circuits and VT Tunnels."

Step 1 Determine the type of upgrade you need to make and be sure you have the necessary cards.Valid card upgrades include:

- Four-port OC-3 to eight-port OC-3
- Single-port OC-12 to four-port OC-12

Valid span upgrades include:

- Single-port OC-12 to OC-48
- Single-port OC-12 to OC-192
- OC-48 to OC-192

Caution You cannot upgrade a four-port OC-12 span. If the ring contains any OC12-4 cards and you need to upgrade all the spans in the ring, you will need to downgrade the OC12-4 card to a single-port OC-12 card (which is only possible if one port on the OC12-4 card is being used).

Step 2 Complete the "DLP-A60 Log into CTC" task on page 3-24. If you are already logged in, continue with Step 3.

Note The Span Upgrade option will only be visible and available if the hardware necessary for the upgrade is present; for example, no upgrade is possible from an OC-48 span unless XC10G cards are installed in the nodes at both ends of the span.

According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 3 Ensure that no alarms or abnormal conditions (regardless of severity), including LOS, LOF, AIS-L, SF, SD, and FORCED-REQ-RING are present. See the "DLP-A298 Check the Network for Alarms and Conditions" task on page 15-3 for instructions.

Note During the upgrade/downgrade some minor alarms and conditions display and then clear automatically. No service-affecting alarms (SA, Major, or Critical) should occur other than BLSROSYNC, which will clear when the upgrade/downgrade of all nodes is complete. If any other service-affecting alarms occur, Cisco recommends backing out of the procedure.
A four-node BLSR can take up to five minutes to clear all of the BLSROSYNC alarms. Allow extra time for a large BLSR to clear all of the BLSROSYNC alarms.

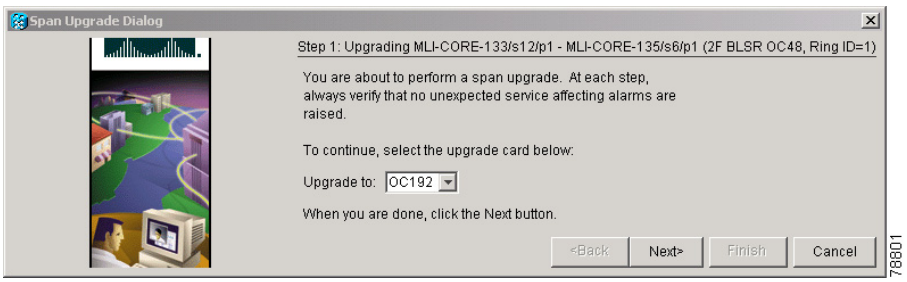
Step 4 In network view, right-click the span you want to upgrade.

Step 5 Choose **Span Upgrade** from the drop-down menu.

Step 6 The first Span Upgrade dialog box appears (Figure 14-1). Follow the instructions on the dialog box and the wizard will lead you through the rest of the span upgrade.

Note The Back button is only enabled on Step 2 of the wizard; because you cannot back out of an upgrade via the wizard, close the wizard and initiate the manual procedure if you need to back out of the upgrade at any point beyond Step 2.

Figure 14-1 Span Upgrade Wizard



Caution As indicated by the wizard, when installing cards you must wait for the cards to boot up and become active before proceeding to the next step.

Note Remember to attach the fiber after installing the OC-N cards.

Note The span upgrade process resets the line's CV-L threshold to factory default. The CV-L threshold is reset because the threshold is dependent on line rate.

Step 7 Repeat Steps 4 through 6 for additional spans in the ring.

Stop. You have completed this procedure.

NTP-A95 Upgrade OC-N Spans Manually

Purpose	This procedure upgrades OC-N speeds within BLSRs, path protection, and 1+1 protection groups by upgrading OC-N cards. Complete a manual upgrade task if you need to perform error recovery for the Span Upgrade Wizard or back out of a span upgrade (downgrade).
Tools/Equipment	Replacement cards
Prerequisite Procedures	The manual span upgrade procedure requires at least two technicians (one at each end of the span) who can communicate with each other during the upgrade.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Note OC-N card transmit and receive levels should be in their acceptable range as shown in the specifications section for each card in the "NTP-A247 Install Fiber-Optic Cables on OC-N Cards" procedure on page 2-29.

Note In this context the word "span" represents the OC-N path between two nodes. The words "span endpoint" represent the nodes on each end of a span.

Note If any of the cross-connect cards reboot during the span upgrade, you must reset each one when the span upgrade procedure is complete for all the nodes in the ring.

Step 1 Determine the type of span you need to upgrade and make sure you have the necessary cards. Valid span upgrades include:

- Four-port OC-3 to eight-port OC-3
- Single-port OC-12 to four-port OC-12
- Single-port OC-12 to OC-48
- Single-port OC-12 to OC-192
- OC-48 to OC-192

Caution You cannot upgrade a four-port OC-12 span. If the ring contains any OC-12-4 cards and you need to upgrade all the spans in the ring, you will need to downgrade the OC-12-4 card to a single-port OC-12 card (which is not possible unless only one port on the OC12-4 card is being used).

Step 2 Complete the "DLP-A60 Log into CTC" task on page 3-24. If you are already logged in, continue with Step 3.

Step 3 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 17-7.

Step 4 Ensure that no alarms or abnormal conditions (regardless of severity), including LOS, LOF, AIS-L, SF, SD, and FORCED-REQ-RING are present. See the "DLP-A298 Check the Network for Alarms and Conditions" task on page 15-3 for instructions.

Note During the upgrade/downgrade some minor alarms and conditions display and then clear automatically. No service-affecting alarms (SA, Major, or Critical) should occur other than BLSROSYNC, which will clear when the upgrade/downgrade of all nodes is complete. If any other service-affecting alarms occur, Cisco recommends backing out of the procedure.
A four-node BLSR can take up to five minutes to clear all of the BLSROSYNC alarms. Allow extra time for a large BLSR to clear all of the BLSROSYNC alarms. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for information about alarms.

Step 5 Complete the appropriate task:

- DLP-A293 Perform a Manual Span Upgrade on a Two-Fiber BLSR, page 14-13
- DLP-A294 Perform a Manual Span Upgrade on a Four-Fiber BLSR, page 14-14
- DLP-A295 Perform a Manual Span Upgrade on a Path Protection, page 14-16
- DLP-A296 Perform a Manual Span Upgrade on a 1+1 Protection Group, page 14-17
- DLP-A297 Perform a Manual Span Upgrade on an Unprotected Span, page 14-18

Note The span upgrade process resets the line's CV-L threshold to factory default. The CV-L threshold is reset because the threshold is dependent on line rate.

Note The Span Upgrade option will only be visible and available if the hardware necessary for the upgrade is present; for example, no upgrade is possible from an OC48 span unless XC10G cards are installed in the nodes at both ends of the span.

Note A four-port OC-3 to eight-port OC-3 span upgrade, or an OC-12 to four-port OC-12 span upgrade can only be performed from multispeed slots (Slots 1 to 4 and 14 to17) because the OC3-8 and OC12-4 card can only be installed in multispeed slots. Ensure that the OC-3 and OC-12 cards are in multispeed slots before performing a span upgrade to the OC3-8 and OC12-4. The four OC-3 ports will be mapped to Ports 1-4 on the eight-port OC-3 card. The OC-12 port will be mapped to Port 1 on the four-port OC-12 card.

Stop. You have completed this procedure.

DLP-A293 Perform a Manual Span Upgrade on a Two-Fiber BLSR

Purpose	This task upgrades a two-fiber BLSR span to a higher OC-N rate. To downgrade a span, repeat this task but choose a lower-rate card in Step 5.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade Attenuators might be needed for some applications
Prerequisite Procedures	DLP-A60 Log into CTC, page 3-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Do not perform any other maintenance operations or add any circuits during a span upgrade.

Note All spans connecting the nodes in a BLSR must be upgraded before the bandwidth is available.

Note BLSR protection channel access (PCA) circuits, if present, will remain in their existing STSs. Therefore, they will be located on the working path of the upgraded span and will have full BLSR protection. To route PCA circuits on protection channels in the upgraded span, delete and recreate the circuits after the span upgrade. For example, if you upgrade an OC-48 span to an OC-192, PCA circuits on the protection STSs (STSs 25 to 48) in the OC-48 BLSR will remain in their existing STSs (STSs 25 to 48) which are working, protected STSs in the OC-192 BLSR. Deleting and recreating the OC-48 PCA circuits moves the circuits to STSs 96 to 192 in the OC-192 BLSR. To delete circuits, see the "NTP-A278 Modify and Delete Overhead Circuits" procedure on page 11-19. To create circuits, see Chapter 8, "Create Circuits and VT Tunnels."

Step 1 Apply a Force switch to both span endpoints (nodes) on the span that you will upgrade first. See the "DLP-A303 Initiate a BLSR Force Ring Switch" task on page 16-7.

Step 2 Remove the fiber from both endpoints and ensure that traffic is still running.

Step 3 Remove the OC-N cards from both endpoints.

Step 4 From both endpoints, in node view right-click each OC-N slot and choose **Change Card**.

Step 5 In the Change Card dialog box, choose the new OC-N card type.

Step 6 Click **OK**.

Step 7 Complete the "NTP-A16 Install the OC-N Cards" procedure on page 2-12 to install the new OC-N cards in both endpoints.

Step 8 Verify that the transmit and receive signals fall within the acceptable range. See Table 2-5 on page 2-31 for OC-N card transmit and receive levels. If the receive level falls outside the acceptable range for that card, attenuate accordingly.

Step 9 Complete the "DLP-A44 Install Fiber-Optic Cables for BLSR Configurations" task on page 2-37 to attach the fiber to the cards. Wait for the IMPROPRMVL alarm to clear and the cards to become active.

Step 10 When cards in both endpoint nodes have been successfully upgraded and all the facility alarms (LOS, SD or SF) are cleared, remove the forced switch from both endpoints on the upgraded span. See the "DLP-A194 Clear a BLSR Force Ring Switch" task on page 16-8.

Step 11 Perform an exercise ring test to check the BLSR ring functionality without switching traffic. See the "DLP-A217 BLSR Exercise Ring Test" task on page 6-24.

Step 12 Repeat this task for each span in the BLSR. When you are done with each span, the upgrade is complete.

Step 13 Return to your originating procedure (NTP).

DLP-A294 Perform a Manual Span Upgrade on a Four-Fiber BLSR

Purpose	This task upgrades a four-fiber BLSR span to a higher OC-N rate. Repeat the task to upgrade each span to the higher OC-N rate. To downgrade a span, repeat this task but choose a lower-rate card in Step 5.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade Attenuators might be needed for some applications
Prerequisite Procedures	DLP-A60 Log into CTC, page 3-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Do not perform any other maintenance operations or add any circuits during a span upgrade.

Note All spans connecting the nodes in a BLSR must be upgraded before the bandwidth is available.

Note BLSR protection channel access (PCA) circuits, if present, will remain in their existing STSs. Therefore, they will be located on the working path of the upgraded span and will have full BLSR protection. To route PCA circuits on protection channels in the upgraded span, delete and recreate the circuits after the span upgrade. For example, if you upgrade an OC-48 span to an OC-192, PCA circuits on the protection STSs (STSs 25 to 48) in the OC-48 BLSR will remain in their existing STSs (STSs 25 to 48) which are working, protected STSs in the OC-192 BLSR. Deleting and recreating the OC-48 PCA circuits moves the circuits to STSs 96 to 192 in the OC-192 BLSR. To delete circuits, see the "NTP-A278 Modify and Delete Overhead Circuits" procedure on page 11-19. To create circuits, see Chapter 8, "Create Circuits and VT Tunnels."

Step 1 Apply a Force switch to both span endpoints (nodes) on the span that you will upgrade first. See the "DLP-A303 Initiate a BLSR Force Ring Switch" task on page 16-7.

Step 2 Remove the fiber from both working and protect cards at both span endpoints (nodes) and ensure that traffic is still running.

Step 3 Remove the OC-N cards from both end points.

Step 4 For both ends of the span endpoints, in node view right-click each OC-N slot and choose **Change Card**.

Step 5 In the Change Card dialog box, choose the new OC-N card type.

Step 6 Click **OK**.

Step 7 Complete the "NTP-A16 Install the OC-N Cards" procedure on page 2-12 to install the new OC-N cards in both endpoints.

Step 8 Verify that the transmit signal falls within the acceptable range. See Table 2-5 on page 2-31 for OC-N card transmit and receive levels.

Step 9 Complete the "DLP-A44 Install Fiber-Optic Cables for BLSR Configurations" task on page 2-37 to attach the fiber to the cards. Wait for the IMPROPRMVL alarm to clear and the cards to become active.

Step 10 When cards in both endpoint nodes have been successfully upgraded and all the facility alarms (LOS, SD or SF) are cleared, remove the forced switch from both endpoints (nodes) on the upgraded span. See "DLP-A194 Clear a BLSR Force Ring Switch" task on page 16-8.

Step 11 Perform an exercise ring test to check the BLSR ring functionality without switching traffic. See the "DLP-A217 BLSR Exercise Ring Test" task on page 6-24.

Step 12 Repeat these steps for each span in the BLSR. When all spans in the BLSR have been upgraded, the ring is upgraded.

Step 13 Return to your originating procedure (NTP).

DLP-A295 Perform a Manual Span Upgrade on a Path Protection

Purpose	This task upgrades path protection spans to a higher OC-N speed. Repeat the task for each span to upgrade the entire ring to the higher OC-N rate. To downgrade a span, repeat this task but choose a lower-rate card in Step 5.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade
Prerequisite Procedures	DLP-A60 Log into CTC, page 3-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Do not perform any other maintenance operations or add any circuits during a span upgrade.

Step 1 Complete the "DLP-A197 Initiate a Path Protection Force Switch" task on page 16-16 to apply a Force switch on the span that you will upgrade.

Step 2 Remove the fiber from both endpoint nodes in the span and ensure that traffic is still running.

Step 3 Remove the OC-N cards from both span endpoints.

Step 4 For both ends of the span, in node view right-click each OC-N slot and choose **Change Card**.

Step 5 In the Change Card dialog box, choose the new OC-N card type.

Step 6 Click **OK**.

Step 7 Complete the "NTP-A16 Install the OC-N Cards" procedure on page 2-12 to install the new OC-N cards in both endpoints.

Step 8 Verify that the transmit signal falls within the acceptable range. See Table 2-5 on page 2-31 for OC-N card transmit and receive levels.

Step 9 Complete the "DLP-A43 Install Fiber-Optic Cables for UPSR Configurations" task on page 2-34 to attach the fiber to the cards. Wait for the IMPROPRMVL alarm to clear and the cards to become active.

Step 10 Complete the "DLP-A198 Clear a Path Protection Force Switch" task on page 16-18 when cards in both endpoint nodes have been successfully upgraded and all the facility alarms (LOS, SD or SF) are cleared.

Step 11 Return to your originating procedure (NTP).

DLP-A296 Perform a Manual Span Upgrade on a 1+1 Protection Group

Purpose	This task upgrades a linear span to a higher OC-N rate. To downgrade a span, follow this task but choose a lower-rate card in Step 6.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade
Prerequisite Procedures	DLP-A60 Log into CTC, page 3-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Do not perform any other maintenance operations or add any circuits during a span upgrade.

Step 1 Initiate a Force switch on the ports you will upgrade, beginning with the protect port:

a. In node view, click the **Maintenance > Protection** tabs.

b. Choose the protection group from the Protection Groups area. In the Selected Group area, the working and protect spans appear.

c. In the Selected Group area, click the protect OC-N port.

d. In Switch Commands, choose **Force**.

e. Click **Yes** in the confirmation dialog box.

FORCE-SWITCH-TO-WORKING appears next to the forced span.

Step 2 If you are upgrading a multiport card, repeat Step 1 for each port.

Step 3 Remove the fiber from both ends of the span and ensure that traffic is still running.

Step 4 Remove the OC-N cards from both span endpoints.

Step 5 At both ends of the span, in node view, right-click the OC-N slot and choose **Change Card**.

Step 6 In the Change Card dialog box, choose the new OC-N card type.

Step 7 Click **OK**.

Step 8 Complete the "NTP-A16 Install the OC-N Cards" procedure on page 2-12 to install the new OC-N cards in both endpoints.

Step 9 Verify that the transmit signal falls within the acceptable range. See Table 2-5 on page 2-31 for OC-N card transmit and receive levels.

Step 10 Complete the "DLP-A428 Install Fiber-Optic Cables in a 1+1 Configuration" task on page 2-33 to attach the fiber to the cards. Wait for the IMPROPRMVL alarm to clear and the cards to become active.

Step 11 When cards on each end of the span have been successfully upgraded and all the facility alarms (LOS, SD or SF) are cleared, remove the Force switch:

a. In node view, click the **Maintenance > Protection** tabs.

b. In the Protection Groups area, click the protection group that contains the card/port you want to clear.

c. In the Selected Group area, click the card you want to clear.

d. In Switch Commands, choose **Clear**.

e. Click **Yes** in the confirmation dialog box.

Step 12 Repeat this task for any other spans in the 1+1 linear configuration.

Step 13 Return to your originating procedure (NTP).

DLP-A297 Perform a Manual Span Upgrade on an Unprotected Span

Purpose	This task manually upgrades unprotected spans to a higher OC-N rate.
Tools/Equipment	Higher-rate cards Compatible hardware necessary for the upgrade
Prerequisite Procedures	DLP-A60 Log into CTC, page 3-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

Caution Upgrading unprotected spans will cause all traffic running on those spans to be lost.

Caution Do not perform any other maintenance operations or add any circuits during a span upgrade.

Caution Removing the fiber will cause all traffic on the unprotected span to be lost.

Step 1 Remove the fiber from both endpoint nodes in the span.

Step 2 Remove the OC-N cards from both span endpoints.

Step 3 For both ends of the span, in node view, right-click each OC-N slot and choose **Change Card**.

Step 4 In the Change Card dialog box, choose the new OC-N type.

Step 5 Click **OK**.

Step 6 When you have finished Steps 2 through 5 for both nodes, install the new OC-N cards in both endpoints and attach the fiber to the cards. Wait for the IMPROPRMVL alarm to clear and the cards to become active.

Step 7 Return to your originating procedure (NTP).