Upgrade Cards and Spans

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> **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.

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

Before You Begin

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

1. NTP-A220 Upgrade the XCVT Card to the XC10G Card, page 12-2—Complete as needed.

2. NTP-A333 Upgrade the XCVT/XC10G Card to the XC-VXC-10G Card, page 12-3—Complete as needed.

3. NTP-A296 Upgrade the TCC2 Card to the TCC2P Card, page 12-5—Complete as needed.

4. NTP-A93 Upgrade the DS3-12 Card to the DS3-12E Card, page 12-7— Complete as needed.

5. NTP-A308 Upgrade Low-Density Electrical Cards to High-Density Electrical Cards, page 12-9—Complete as needed to upgrade low-density cards in a 1:N configuration to high-density cards.

6. NTP-A254 Downgrade a DS3-12E/DS3NE Card to a DS3-12/DS3N-12 Card, page 12-12—Complete as needed to downgrade a DS3E card or to back out of a DS3-12 to DS3-12E card upgrade.

7. NTP-A94 Upgrade OC-N Cards and Spans Automatically, page 12-13—Complete this procedure as needed to upgrade OC-N cards within path protection configurations, bidirectional line switched rings (BLSRs), and 1+1 protection groups.

8. NTP-A95 Upgrade OC-N Spans Manually, page 12-16—Complete this procedure as needed to perform error recovery for the Span Upgrade Wizard or back out of a span upgrade (downgrade).

9. NTP-A370 Upgrade OC-N Cards Manually, page 12-18—Complete this procedure as needed to upgrade the OC-N cards manually.

NTP-A220 Upgrade the XCVT Card to the XC10G Card

Purpose	This procedure upgrades an 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

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.

Note The XC10G requires the 15454-SA-ANSI or the 15454-SA-HD shelf assembly.

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

Note Downgrading from XC10G cards to XCVT cards is not supported.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 17-65 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 15-4.

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

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

   a. Open the 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 some time (20 to 30 seconds), and turns off. The ACT/STBY LED turns amber and remains on. In node view, the XC10G appears as the standby 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** in 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.

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

   a. Open the XCVT card ejectors.

   b. Slide the 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.

> **Note** After you change out the first card, CTC continues to display the XCVT card in both slots. The display does not change to reflect the XC10G cards until the second card is upgraded and the XC10G card in that slot boots up.

Stop. You have completed this procedure.

NTP-A333 Upgrade the XCVT/XC10G Card to the XC-VXC-10G Card

Purpose	This procedure upgrades the XCVT or XC10G card to an XC-VXC-10G card.
Tools/Equipment	Two XC-VXC-10G cards
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

> **Note** The XC-VXC-10G requires the 15454-SA-ANSI or the 15454-SA-HD shelf assembly.

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   The SWMTXMOD-PROT and SWMTXMOD-WORK alarms might appear when the standby and active cross-connect cards are replaced, but will clear after the cards are replaced.

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

Note   Downgrading from XC-VXC-10G cards to XCVT or XC10G cards is not supported.

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 17-65 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 15-4.

Step 3   Complete the "DLP-A600 Perform BLSR Lockout" task on page 23-1 to avoid short wrap condition if the XC or XCVT or XC10G card that are being replaced are on the node which is part of BLSR ring.

Step 4   Determine the standby XCVT or XC10G card. The ACT/STBY LED of the standby XCVT or XC10G card is amber, while the ACT/STBY LED of the active XCVT or XC10G card is green.

Step 5   Physically replace the standby XCVT or XC10G card on the ONS 15454 with an XC-VXC-10G card:

    a.   Open the XCVT or XC10G 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 XC-VXC-10G card.

    d.   Slide the XC-VXC-10G card into the slot along the guide rails.

    e.   Close the ejectors.

    Note   On the XC-VXC-10G card, the fail LED above the ACT/STBY LED becomes red, blinks for some time (20 to 30 seconds), and turns off. The ACT/STBY LED turns amber and remains on.

Step 6   In node view, click the **Maintenance > Cross-Connect** tabs.

Step 7   From the Cross Connect Cards menu, choose **Switch**.

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Note When upgrading from XCVT or XC10G card to an XC-VXC-10G card with Path Protection circuits and a cross connect side switch is performed, the path protected circuits may switch from a working to protect path causing traffic hit.

Step 8 Click **Yes** in the Confirm Switch dialog box. Traffic switches to the XC-VXC-10G card that you inserted in Step 4. The ACT/STBY LED on this card changes from amber to green.

Step 9 Physically remove the now standby XCVT or XC10G card from the ONS 15454 and insert the second XC-VXC-10G card into the empty XCVT or XC10G card slot:

   a. Open the XCVT or XC10G card ejectors.

   b. Slide the XCVT or XC10G card out of the slot.

   c. Open the ejectors on the XC-VXC-10G card.

   d. Slide the XC-VXC-10G card into the slot along the guide rails.

   e. Close the ejectors.

The upgrade is complete when the second XC-VXC-10G card boots up and becomes the standby XC-VXC-10G card. In node view, both the active and standby cards change to XC-VXC-10G.

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Note After you change out the first card, CTC continues to display the XCVT or XC10G card in both slots. The display does not change to reflect the XC-VXC-10G cards until the second card is upgraded and the XC-VXC-10G card in that slot boots up.

Step 10 Complete the "DLP-A601 Remove BLSR Lockout" task on page 23-2 to remove BLSR Lockout performed in Step 3.

Stop. You have completed this procedure.

NTP-A296 Upgrade the TCC2 Card to the TCC2P Card

Purpose	This procedure upgrades the TCC2 card to the TCC2P card. The TCC2 and TCC2P cards support ONS 15454 Software R4.0 and later software versions.
Tools/Equipment	Two SONET TCC2P cards
	Two TCC2 cards
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

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Note Downgrading from TCC2P cards to TCC2 cards is not supported.

Step 1 Verify that the LAN wires on the backplane are installed properly. The TCC2 card does not autodetect miswired LAN connections. If a LAN connection is miswired, a LAN Connection Polarity Reversed condition appears. See the "DLP-A21 Install LAN Wires on the Backplane" task on page 17-26 for instructions.

Step 2 Complete the "DLP-A60 Log into CTC" task on page 17-65. If you are already logged in, continue with Step 2.

Step 3 Ensure that no alarms or abnormal conditions are present. See the "DLP-A298 Check the Network for Alarms and Conditions" task on page 19-60 for instructions.

Step 4 Before you begin the upgrade, complete the "NTP-A108 Back Up the Database" procedure on page 15-4. Make sure ONS 15454 Software R4.0 or later is installed on the node. Refer to the release-specific software upgrade document. TCC2 and TCC2P cards are not compatible with releases prior to Software R4.0.

Step 5 Physically replace the standby TCC2 card on the ONS 15454 with a TCC2P card:

   a. Check the LED on the faceplate. The ACT/STBY LED on the faceplate of the TCC2 card indicates whether the card is in active or standby mode. A green ACT/STBY LED indicates an active card and an amber light indicates a standby card.

   b. Open the standby TCC2 card ejectors.

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

   d. Open the ejectors on the TCC2P card to be installed.

   e. Slide the TCC2P card into the slot along the guide rails.

   f. Close the ejectors.

   g. In CTC node view, Ldg (loading) appears on the recently installed TCCP2 card.

Note During a TCC2 upgrade, the CONTBUS-IO-A or CONTBUS-IO-B TCC A (or B) To Shelf Slot Communication Failure alarm is raised as the TCC2 briefly loses communication with the backplane. This alarm usually clears after approximately 13 minutes. If the condition does not clear after a period, log onto http://www.cisco.com/tac for more information or call Cisco TAC at (800) 553-2447.

Note It takes approximately 10 minutes for the active TCC2 card to transfer the database to the newly installed TCC2P card. During this operation, the LEDs on the TCC2P flash Fail and then the active/standby LED flashes. When the transfer completes, the TCC2P card reboots and goes into standby mode after approximately three minutes. Do not remove the card from the shelf during a database transfer.

Caution If your active TCC2 card resets during the upgrade before the new TCC2P card has come to a full standby mode, remove the new TCC2P card immediately.

Step 6 When the newly installed TCC2P card is in standby, go to the active TCC2 and right-click the card.

Step 7 From the drop-down list, click **Reset Card**.

Wait for the TCC2 card to reboot. The ONS 15454 switches the standby TCC2P card to active mode. The TCC2 card verifies that it has the same database as the TCC2P card and then switches to standby.

Step 8 Verify that the remaining TCC2 card is now in standby mode (the ACT/STBY LED changes to amber).

Step 9 Perform Step 5 to physically replace the remaining TCC2 card with the second TCC2P card.

The ONS 15454 boots up the second TCC2P card. The second TCC2P card must also copy the database, which can take approximately 10 minutes. Do not remove the card from the shelf during a database transfer.

Step 10 If power-related alarms occur after the second TCC2P card is installed, check the voltage on the backplane. See the "DLP-A33 Measure Voltage" task on page 17-39 for instructions. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for information about clearing alarms.

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 2-9
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.

Note In CTC, the DS3-12E/DS3N-12E card is displayed as DS3E/DS3NE.

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 12-12.

Step 1   Complete the "DLP-A60 Log into CTC" task on page 17-65. 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 15-4.

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

   a.   Protected cards are listed under Protection Groups on the **Maintenance > Protection** tab. The slot, port, and status (that is, Protect/Standby, Working/Active) of each card is listed in the Selected Group area.

   b.   An unprotected card is not listed in the Protection Groups/Selected Group area on the **Maintenance > Protection** tab.

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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, ignoring 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 list.

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

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.   On 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-A308 Upgrade Low-Density Electrical Cards to High-Density Electrical Cards

Purpose	This task upgrades low-density electrical cards in a 1:N protection scheme (where N = 1 or 2) to high-density electrical cards (DS3/EC1-48 and DS1/E1-56 cards). Low-density cards are defined as any of the following: DS-1, DS3-12, EC1-12, and DS3XM-6.
Tools/Equipment	DS3/EC1-48 card(s) or DS1/E1-56 card(s)
	High-density shelf assembly (15454-SA-HD)
	High-density electrical interface assembly (EIA) installed (MiniBNC, UBIC-V, UBIC-H)
Prerequisite Procedures	NTP-A17 Install the Electrical Cards, page 2-9
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

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

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Note   You cannot upgrade electrical cards from low-density to high-density if the low-density electrical cards are installed in Slots 4, 5, or 6 (or 12, 13, or 14 on the B side of the shelf). Only cards in Slots 1, 2, 16, and 17 can be upgraded to high-density electrical cards.

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Note   This procedure describes an upgrade of Slots 1, 2, and 3 (15, 16, and 17) to high-density electrical cards. However, you can have any combination of low-density (12-port) electrical cards and high-density cards in Slots 1 and 2 (16 and 17) after you upgrade the protect card (Slot 3 or 15) to a high-density electrical card.

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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.

Step 1   Complete the "DLP-A60 Log into CTC" task on page 17-65. 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 15-4.

Step 3   Determine which low-density card(s) (DS-1, DS-3, DS-3E) you want to upgrade to high-density, according to slot limitations.

The following limitations apply if you are upgrading a low-density protect card:

- The protect card must be in a protection group.

- The protect card must not protect any low-density electrical cards in Slots 4, 5, or 6 on the A side of the shelf (Slots 12, 13, or 14 on the B side).

- For 1:N protection groups where N = 2: On the A side, the protect card cannot be upgraded if any electrical cards are installed or preprovisioned in Slots 4, 5, or 6 (or Slots 12, 13, or 14 on the B side).

- For 1:N protection groups where N = 1: On the A side, if the protect card is installed in Slot 3 and it protects a low-density card in Slot 1, the protect card cannot be upgraded if Slot 5 or 6 has an electrical card installed or preprovisioned. For the B side, if the protect card is installed in Slot 15 and it protects a low-density card in Slot 17, the protect card cannot be upgraded if Slot 12 or 13 has an electrical card installed or preprovisioned.

- For 1:N protection groups where N = 1: On the A side, if the protect card is installed in Slot 3 and it protects a low-density card in Slot 2, the protect card cannot be upgraded if an electrical card is installed or preprovisioned in Slot 4. On the B side, if the protect card is installed in Slot 15 and it protects a low-density card in Slot 16, the protect card cannot be upgraded if an electrical card is installed or preprovisioned in Slot 14.

The following limitations apply to upgrading a working card after you have upgraded the protect card:

- A working card in Slot 1 on the A side (Slot 17 on the B side) cannot be upgraded if an electrical card is installed or preprovisioned in Slot 5 or 6 (Slot 12 or 13 on the B side).

- A working card in Slot 2 on the A side (Slot 16 on the B side) cannot be upgraded if an electrical card is installed or preprovisioned in Slot 4 (Slot 14 on the B side).

Step 4 In node view, double-click the current protect card. The card view appears.

Slot 3 contains the protect card if you are working on the A side of the shelf, and Slot 15 contains the protect card if you are working on the B side of the shelf.

Step 5 Make sure the current protect card is not active:

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

b. Select the protection group where the protect card resides.

Step 6 If the card status is Protect/Active, perform a switch so that the protect card becomes standby:

a. Click **Switch.**

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

Step 7 Physically remove the card:

a. Open the card ejectors.

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

Step 8 Right-click the protect slot (Slot 3 or Slot 15) and change the low-density card to the high-density card:

a. Choose **Change Card** from the drop-down list.

b. Choose the new card type (DS3/EC1-48) from the Change to drop-down list.

c. Click **OK**.

Step 9 Physically insert the new DS3/EC1-48 card into the protect slot:

a. Open the ejectors on the card.

b. Slide the card into the slot along the guide rails.

c. Close the ejectors.

Wait for the IMPROPRMVL alarm to clear and the card to become standby. For more information about LED behavior during DS3/EC1-48 card boot-up, see the "NTP-A17 Install the Electrical Cards" procedure on page 2-9.

Step 10 Because the low-density card is now active, switch traffic away from the low-density card in Slot 1 if you are working on the A side or Slot 17 if you are working on the B side:

a. In node view, double-click the card in Slot 1/Slot 17.

b. Click the **Maintenance > Protection** tabs.

c. Double-click the protection group that contains the card in Slot 1/Slot 17.

d. Click the card in Slot 1/Slot 17.

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

Step 11 Physically remove the low-density card in Slot 1/Slot 17:

a. Open the card ejectors.

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

Step 12 Change the low-density card to the high-density card in CTC:

a. Right-click Slot 1/Slot 17 and choose **Change Card** from the drop-down list.

b. Choose the new card type (DS3/EC1-48) from the Change to drop-down list.

c. Click **OK**.

Step 13 Insert the new DS3/EC1-48 card into Slot 1/Slot 17:

a. Open the ejectors on the card.

b. Slide the card into the slot along the guide rails.

c. Close the ejectors.

Wait for the IMPROPRMVL alarm to clear and the card to become standby. For more information about LED behavior during DS3/EC1-48 card bootup, see the "NTP-A17 Install the Electrical Cards" procedure on page 2-9.

Step 14 Clear the switch you performed in Step 10:

a. In node view, double-click the card in Slot 1/Slot 17.

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

c. Click the selected group.

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

The protect card in Slot 3 (A side) or Slot 15 (B side) should now become standby.

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 list.
Tools	None
Prerequisite Procedures	NTP-A17 Install the Electrical Cards, page 2-9
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 list.

Step 1 Complete the "DLP-A60 Log into CTC" task on page 17-65. 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 15-4.

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

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

b. An unprotected card is not listed in the Protection Groups/Selected Group area in the **Maintenance > Protection** tab.

Caution Traffic is 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, ignoring references to the protect card and protect slot. If the card you are upgrading is protected, make sure that 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 list.

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

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-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 or XC-VXC-10G cards and OC-48 any slot [AS] 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.** Statement 206

⚠️

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 Table 2-4 on page 2-17.

✎

Note   During the upgrade, the IMPROPRMVL alarm might 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 Slots 1 to 4 and 14 to 17 because the OC3-8 and OC12-4 card can only be installed in these slots. Ensure that the OC-3 and OC-12 cards are in these 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   The only cards that can be upgraded to a MRC-12 card are one-port OC-12 cards or one-port OC-48 cards. The port from the lower-speed card will be mapped to Port 1 on the MRC-12 card.

✎

Note   BLSR 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 7-4. To create circuits, see Chapter 6, "Create Circuits and VT Tunnels."

✎

Note   Before performing automatic Span Upgrade, make sure that the TCC card is not soft resetting or pulled out and there are no fiber cuts or node power cycles.

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
- Single-port OC-12 to OC-48
- Single-port OC-12 to OC-192
- Single-port OC-12 to OC-48 on MRC-12
- OC-48 to MRC-12
- OC-48 to OC192SR1/STM64IO Short Reach or OC192/STM64 Any Reach

- OC-192 to OC192SR1/STM64IO Short Reach or OC192/STM64 Any Reach

Valid span upgrades include:

- Single-port OC-12 to OC-48
- Single-port OC-12 to OC-192
- Single-port OC-12 to four-port OC-12
- Single-port OC-12 to OC-48 on MRC-12
- OC-48 to OC-192
- OC-48 to MRC-12
- OC-48 to OC192SR1/STM64IO Short Reach or OC192/STM64 Any Reach
- OC-192 to OC192SR1/STM64IO Short Reach or OC192/STM64 Any Reach

⚠

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 only one port on the OC12-4 card is being used).

Step 2   Complete the "DLP-A60 Log into CTC" task on page 17-65. 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 or XC-VXC-10G cards are installed in the nodes at both ends of the span.

Step 3   According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 15-4.

Step 4   Ensure that no alarms or abnormal conditions (regardless of severity), including LOS, LOF, AIS-L, signal failure (SF), signal degrade (SD), and FORCED-REQ-RING are present. See the "DLP-A298 Check the Network for Alarms and Conditions" task on page 19-60 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 5   In network view, right-click the span you want to upgrade.

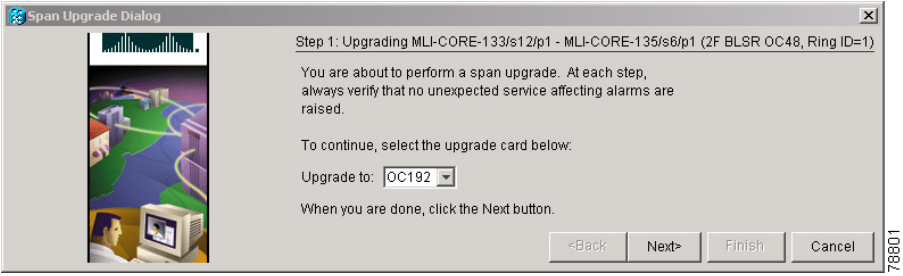**Step 6**   Choose **Span Upgrade** from the drop-down list.

The Span Upgrade wizard shown in Figure 12-1 appears. The information displayed in Figure 12-1 depends on the card that is upgraded. Follow the instructions in the wizard to complete the span upgrade.

✎

Note   The Back button is only enabled in Step 2 of the wizard; because you cannot back out of an upgrade using 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 12-1   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 5 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 configurations, 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 Table 2-4 on page 2-17.

Note In this context, the word "span" represents the OC-N path between two nodes. The phrase "span endpoint" represents 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
- Single-port OC-12 to 15454_MRC-12
- OC-48 to OC-192
- OC-192 to OC192SR1/STM64IO Short Reach or OC192/STM64 Any Reach

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 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 17-65. 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 15-4.

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 19-60 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 19-54
- DLP-A294 Perform a Manual Span Upgrade on a Four-Fiber BLSR, page 19-55
- DLP-A295 Perform a Manual Span Upgrade on a Path Protection, page 19-57
- DLP-A296 Perform a Manual Span Upgrade on a 1+1 Protection Group, page 19-58

- DLP-A297 Perform a Manual Span Upgrade on an Unprotected Span, page 19-59

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 or XC-VXC-10G 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 Slots 1 to 4 and 14 to17, because the OC3-8 and OC12-4 cards can only be installed in these slots. Ensure that the OC-3 and OC-12 cards are in these 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.

NTP-A370 Upgrade OC-N Cards Manually

Purpose	This procedure upgrades OC-N cards. OC-N card upgrades can be performed only on OC-N drop cards. If the OC-N card is used as a trunk card or is involved in a two-fiber or four-fiber BLSR, perform a span upgrade.
Tools/Equipment	• Higher-rate cards
	• XC10G or XC-VXC-10G cards
	• Attenuators may be required for some upgrades.
Prerequisite Procedures	"DLP-A60 Log into CTC" task on page 17-65
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.** Statement 206

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

Note OC-N transmit and receive levels must be in their acceptable range as shown in the specifications for each card in Table 2-4 on page 2-17.

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

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 in Slots 1 to 4 and Slots 14 to 17 because the OC3-8 or OC12-4 card can only be installed in these slots. Ensure that the OC-3 or OC-12 card is in these slots before performing a card upgrade to the OC3-8 or OC12-4 card. 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.

- When performing a card upgrade from OC-12, OC-48, or MRC-12 to OC-192, ensure that the OC-12, OC-48, or MRC-12 card is in Slot 5, 6, 12, or 13. Port migrations are described in Table 12-1.

Table 12-1   Port Migration Information

Original Card	Old Port Numbers	Slot Type	Upgraded Card	New Port Numbers	Cross-Connect Card
OC3-4	1 to 4	Drop	OC3-8	1 to 4	XC10G/XC-VXC-10G
OC-12	1	Drop	OC12-4	1	XC10G/XC-VXC-10G
OC-12	1	Drop	OC-48	1	XC10G/XC-VXC-10G
OC-12	1	Drop	OC-192	1	XC10G/XC-VXC-10G
OC-48	1	Drop	OC-192	1	XC10G/XC-VXC-10G
MRC-12	1	Drop	OC-192	1	XC10G/XC-VXC-10G

Step 1 Determine the type of upgrade you need to perform and make 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, OC-48, or OC-192
- OC-48 to OC-192 Short Reach,or OC-192 Any Reach
- OC-192 to OC-192 Short Reach or OC-192 Any Reach
- MRC-12 to OC-192 Short Reach or OC-192 Any Reach (Port 1 is the only provisioned port on the MRC-12 card)

Step 2 According to local site practice, complete the "NTP-A108 Back Up the Database" procedure on page 15-4.

Step 3 Ensure that no alarms or abnormal conditions (regardless of severity), including LOS, LOF, AIS-L, SF, and SD are present. See the "DLP-A298 Check the Network for Alarms and Conditions" task on page 19-60. During the upgrade, the IMPROPRMVL alarm may be raised but will clear automatically.

Step 4 In the node view, right-click the card you want to upgrade and choose the **Change Card** option. The Change Card dialog box appears.

> ✎
> **Note** The Change Card option is available only if the hardware necessary for the upgrade is present; for example, no upgrade is possible from an OC-12 card unless the XC-10G or XC-VXC-10G cards are installed in the node.

Step 5 Choose the card to upgrade to from the Change to drop-down list.

Step 6 Choose the rate from the Port Rate drop-down list. This field is available only for multi-rate cards.

Step 7 Click **OK** to upgrade the OC-N card to the selected higher-rate OC-N card or MRC card. An MEA (EQPT) alarm is raised because the physical card type does not match the card type provisioned for that slot in CTC.

Step 8 Replace the physical OC-N card with the card selected in Step 7. This clears the MEA (EQPT) alarm. When replacing the PPMs for the upgraded card, ensure that the reach of the PPMs match the values for the upgraded card.

Stop. You have completed this procedure.