



## Upgrade Cards and Spans

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This chapter explains how to upgrade cross-connect cards and optical spans (speeds) within a ring or protection group for the Cisco ONS 15454 SDH.

### Before You Begin

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

1. [NTP-D92 Upgrade the XC10G Card to the XC-VXL-2.5G or XC-VXL-10G Card, page 12-1](#)—Complete as needed.
2. [NTP-D234 Upgrade the XC-VXL-2.5G Card to the XC-VXL-10G Card, page 12-3](#)—Complete as needed.
3. [NTP-D314 Upgrade the TCC2 Card to the TCC2P Card, page 12-4](#)—Complete as needed.
4. [NTP-D94 Upgrade STM-N Cards and Spans Automatically, page 12-6](#)—Complete this procedure as needed to upgrade optical cards within SNCs, MS-SPRings, and 1+1 protection groups.
5. [NTP-D95 Upgrade Optical Spans Manually, page 12-9](#)—Complete this procedure as needed to perform error recovery for the Span Upgrade Wizard or to back out of a span upgrade (downgrade).

### NTP-D92 Upgrade the XC10G Card to the XC-VXL-2.5G or XC-VXL-10G Card

<b>Purpose</b>	This procedure upgrades XC10G cards to XC-VXL-2.5G cards or XC-VXL-10G cards. XC-VXL-2.5G cards work with card speeds up to STM-16. XC-VXL-10G cards work with card speeds up to STM-64.
<b>Tools/Equipment</b>	Replacement cards
<b>Prerequisite Procedures</b>	None
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Maintenance or higher



**Note**

This procedure applies only to XC10G cards that are installed in nodes running Software R4.0 and later.

**Note**

You cannot upgrade from an XC10G to an XC-VXL-2.5G if an STM-64 card is preprovisioned or installed in the node. The XC-VXL-2.5G works only with card speeds up to STM-16.

**Note**

The UNEQ-P alarm is raised during a cross-connect card upgrade if you have E100T-12 or E1000-2 cards installed in the node. The alarm will appear and 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-D60 Log into CTC” task on page 17-47](#). If you are already logged in, continue with Step 2.
- Step 2** Verify that the node you are upgrading has TCC2 cards installed.
- Step 3** Determine the standby XC10G card. The ACT/STBY LED of the standby XC10G card is amber, and the ACT/STBY LED of the active XC10G card is green.

**Note**

You can also place the cursor on the card graphic in CTC to display a dialog that identifies the card as Active or Standby.

- Step 4** Physically replace the standby XC10G card with an XCVXL card:
- Open the XC10G card ejectors.
  - Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the upgrade is complete.
  - Open the ejectors on the XCVXL card.
  - Slide the XCVXL card into the slot along the guide rails.
  - Close the ejectors.

On the XCVXL card the FAIL LED above the ACT/STBY LED becomes red, blinks for approximately a minute, and turns off. The ACT/STBY LED becomes amber and remains 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 XCVXL card that 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 XC10G card from the shelf and insert the second XCVXL card into the empty cross-connect slot:
- Open the XC10G card ejectors.
  - Slide the XC10G card out of the slot.

- c. Open the ejectors on the XCVXL card.
- d. Slide the XCVXL card into the slot along the guide rails.
- e. Close the ejectors.

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

**Stop. You have completed this procedure.**

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## NTP-D234 Upgrade the XC-VXL-2.5G Card to the XC-VXL-10G Card

<b>Purpose</b>	This procedure upgrades XC-VXL-2.5G cards to XC-VXL-10G cards.
<b>Tools/Equipment</b>	Replacement cards
<b>Prerequisite Procedures</b>	None
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Maintenance or higher



**Note**

This procedure applies only to XC-VXL-2.5G cards that are installed in nodes running Software R4.0 and later.

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**Note**

The XC-VXL-2.5G card works only with card speeds up to STM-16.

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**Note**

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

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**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.

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**Step 1**

Complete the [“DLP-D60 Log into CTC” task on page 17-47](#). If you are already logged in, continue with Step 2.

**Step 2**

Determine the standby XC-VXL-2.5G card. The ACT/STBY LED of the standby XC-VXL-2.5G card is amber, and the ACT/STBY LED of the active XC-VXL-2.5G card is green.



**Note**

You can also place the cursor on the card graphic in CTC to display a dialog that identifies the card as Active or Standby.

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- Step 3** Physically replace the standby XC-VXL-2.5G card on the shelf with an XC-VXL-10G card:
- Open the XC-VXL-2.5G card ejectors.
  - Slide the card out of the slot. This raises the IMPROPRMVL alarm, which will clear when the upgrade is complete.
  - Open the ejectors on the XC-VXL-10G card.
  - Slide the XC-VXL-10G card into the slot along the guide rails.
  - Close the ejectors.

On the XC-VXL-10G card the fail LED above the ACT/STBY LED becomes red, blinks for approximately a minute, and turns off. The ACT/STBY LED turns amber and remains illuminated.

**Step 4** In node view, click the **Maintenance > Cross-Connect** tabs.

**Step 5** From the Cross Connect Cards menu, choose **Switch**.

**Step 6** Click **Yes** on the Confirm Switch dialog box. Traffic switches to the XCVXL 10G card that you inserted in Step 3. 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 7** Physically remove the now standby XC-VXL-2.5G card from the shelf and insert the second XC-VXL-10G card into the empty cross-connect slot:

- Open the XC-VXL-2.5G card ejectors.
- Slide the XC-VXL-2.5G card out of the slot.
- Open the ejectors on the XC-VXL-10G card.
- Slide the XC-VXL-10G card into the slot along the guide rails.
- Close the ejectors.

The upgrade is complete when the second XC-VXL-10G card boots up and becomes the standby XC-VXL-10G card.

**Stop. You have completed this procedure.**

## NTP-D314 Upgrade the TCC2 Card to the TCC2P Card

<b>Purpose</b>	This procedure upgrades the TCC2 card to the TCC2P card. The TCC2 and TCCP2 cards support ONS 15454 SDH Software R4.0 and later software versions.
<b>Tools/Equipment</b>	Two TCC2P cards
<b>Prerequisite Procedures</b>	None
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Maintenance or higher

**Note**

The TCC2P card does not support software earlier than R4.0. You will not be able to revert to a software release earlier than Software R4.0 with TCC2P cards installed.

**Note**

Downgrade procedures from TCC2P cards to TCC2 cards are not supported. Contact Cisco Technical Assistance Center (TAC), see [Obtaining Documentation and Submitting a Service Request, page xlvi](#).

- 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-D326 Install LAN Wires on the MIC-C/T/P](#)” task on page 20-18 for instructions.
- Step 2** Complete the “[DLP-D60 Log into CTC](#)” task on page 17-47. If you are already logged in, continue with Step 2.
- Step 3** According to local site practice, complete the “[NTP-D108 Back Up the Database](#)” procedure on page 15-4.
- Step 4** Ensure that no alarms or abnormal conditions are present. See the “[DLP-D298 Check the Network for Alarms and Conditions](#)” task on page 19-61 for instructions.
- Step 5** Before you begin the upgrade, complete the “[NTP-D108 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 6** Physically replace the standby TCC2 card on the ONS 15454 with a TCC2P card.
- 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.
  - Open the standby TCC2 card ejectors.
  - Slide the card out of the slot. This raises the IMPROPRMVL alarm which will clear when the upgrade is complete.
  - Open the ejectors on the TCC2P card to be installed.
  - Slide the TCC2P card into the slot along the guide rails.
  - Close the ejectors.
  - In CTC node view, Ldg (loading) appears on the recently installed TCC2P 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 contact Cisco Technical Assistance Center (TAC), see [Obtaining Documentation and Submitting a Service Request, page xlvi](#).



**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 7** When the newly installed TCC2P card is in standby, go to the active TCC2 and right-click the card.
- Step 8** From the drop-down menu, 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 9** Verify that the remaining TCC2 card is now in standby mode (the ACT/STBY LED changes to amber).
- Step 10** Perform [Step 6](#) 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 11** If power-related alarms occur after the second TCC2P card is installed, complete the [“DLP-D33 Measure Voltage” task on page 17-26](#). Refer to the *Cisco ONS 15454 Troubleshooting Guide* for information on clearing alarms.

**Stop. You have completed this procedure.**

## NTP-D94 Upgrade STM-N Cards and Spans Automatically

<b>Purpose</b>	This procedure upgrades cards, STM-N speeds within MS-SPRings, SNCs, and 1+1 (linear) protection groups using the Span Upgrade Wizard.
<b>Tools/Equipment</b>	Replacement cards
<b>Prerequisite Procedures</b>	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.
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	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

**Note**

Optical transmit and receive levels should be in their acceptable range as shown in the specifications section for each card in the table in [“NTP-D19 Install Fiber-Optic Cables on STM-N Cards” procedure on page 2-14](#).

**Caution**

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

**Note**

An STM-1 to eight-port STM-1 span upgrade, or an STM-4 to four-port STM-4 span upgrade can only be performed from multispeed slots (slots 1–4 and 14–17) because the STM1-8 and STM4-4 card can only be installed in multispeed slots. Ensure that the STM-1 and STM-4 cards are in multispeed slots before performing a span upgrade to the STM1-8 and STM4-4. The four STM-1 ports will be sequentially mapped to ports 1-4 on the eight-port STM-1 card. The STM-4 port will be mapped to port 1 on the four-port STM-4 card.

**Step 1**

Determine the span upgrade you need to perform. Valid span upgrades include:

- Four-port STM-1 to eight-port STM-1
- Single-port STM-4 to four-port STM-4
- Single-port STM-4 to STM-16
- Single-port STM-4 to STM-64
- STM-16 to STM-64

**Note**

You cannot upgrade a four-port STM-4 span. If the ring contains any STM4-4 cards and you want to upgrade the entire ring, you will have to downgrade the STM4-4 card to a single-port STM-4 card (which is not possible unless only one port on the STM4-4 card is being used).

**Note**

Do not upgrade an STM-16 to an STM-64 if you have XCVXL 2.5Gs installed. The XCVXL 2.5G card works only with card speeds up to STM-16.

**Step 2**

Complete the [“DLP-D60 Log into CTC” task on page 17-47](#). If you are already logged in, continue with Step 3.

**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-D298 Check the Network for Alarms and Conditions” task on page 19-61](#) for instructions.

**Note**

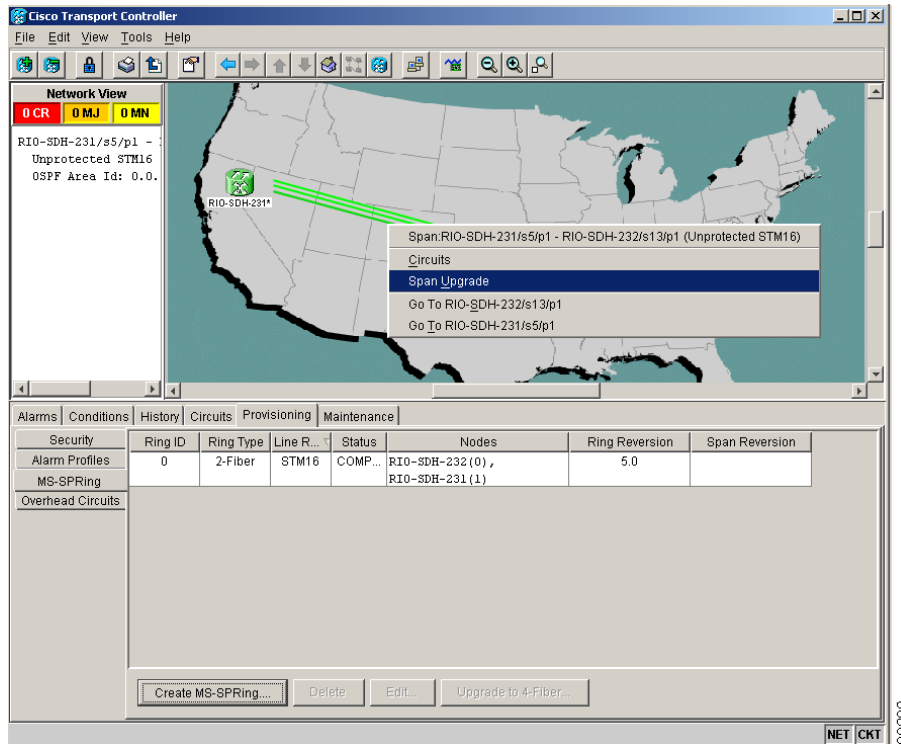
During the upgrade/downgrade some minor alarms and conditions display and then clear automatically. No service-affecting alarms (SA, Major, or Critical) should occur other than MSSP-OSYNC, which will clear when the upgrade/downgrade of all nodes is complete. If any other service-affecting alarms occur,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

**Step 4**

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

**Step 5** Choose **Span Upgrade** from the shortcut menu (Figure 12-1).

**Figure 12-1** Span Upgrade Shortcut Menu

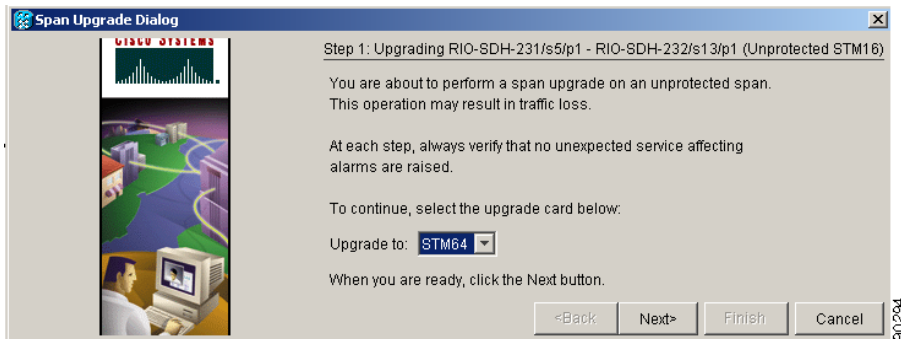


**Step 6** The first Span Upgrade dialog box appears (Figure 12-2). Follow the instructions in the dialog box and the wizard will lead you through the rest of the span upgrade.



**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 12-2** 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**

If you install STM-64 cards, a disabled STM-64 laser causes an LOS alarm to be reported for each STM-64 slot. Enable the STM-64 laser by setting the safety key lock on the STM-64 faceplate to the ON position (labeled 1).

**Note**

Remember to attach the fiber after installing the STM-N cards.

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

**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.

**Stop. You have completed this procedure.**

## NTP-D95 Upgrade Optical Spans Manually

<b>Purpose</b>	This procedure upgrades STM-N speeds within MS-SPRings, SNCs, and 1+1 protection groups by upgrading STM-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).
<b>Tools/Equipment</b>	Replacement cards
<b>Prerequisite Procedures</b>	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.
<b>Required/As Needed</b>	As needed
<b>Onsite/Remote</b>	Onsite
<b>Security Level</b>	Provisioning or higher

**Caution**

If you want to upgrade all of the spans in a ring, determine if there are any four-port STM-4 cards in the ring. If the ring contains any STM4-4 cards and you wish to continue with the upgrade, you will have to downgrade the STM4-4 card to a single-port STM-4 card (which is not possible unless only one port on the STM4-4 card is being used).

**Note**

Optical card transmit and receive levels should be in their acceptable range as shown for each card in [Table 2-3 on page 2-15](#).

**Note**

In this context the word “span” represents the optical 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 span upgrade you need to perform. Valid span upgrades include:

- Four-port STM-1 to eight-port STM-1
- Single-port STM-4 to four-port STM-4
- Single-port STM-4 to STM-16
- Single-port STM-4 to STM-64
- STM-16 to STM-64

**Note**

Do not upgrade an STM-16 to an STM-64 if you have XCVXL 2.5Gs installed. The XCVXL 2.5G works only with card speeds up to STM-16.

**Step 2** Complete the “[DLP-D60 Log into CTC](#)” task on page 17-47. If you are already logged in, continue with Step 3.

**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-D298 Check the Network for Alarms and Conditions](#)” task on page 19-61 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 MSSP-OSYNC, 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 MS-SPRing can take up to five minutes to clear all of the MSSP-OSYNC alarms. Allow extra time for a large MS-SPRing to clear all of the MSSP-OSYNC alarms.

**Step 4** Complete the appropriate task:

- [DLP-D293 Perform a Manual Span Upgrade on a Two-Fiber MS-SPRing](#), page 19-56
- [DLP-D294 Perform a Manual Span Upgrade on a Four-Fiber MS-SPRing](#), page 19-57
- [DLP-D295 Perform a Manual Span Upgrade on an SNCP](#), page 19-58
- [DLP-D296 Perform a Manual Span Upgrade on a 1+1 Protection Group](#), page 19-59
- [DLP-D297 Perform a Manual Span Upgrade on an Unprotected Span](#), page 19-60

**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.



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**Note** Span upgrades do not upgrade SDH topologies; for example, 1+1 protection group to a two-fiber MS-SPRing.

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**Note** An STM-1 to eight-port STM-1 span upgrade, or an STM-4 to four-port STM-4 span upgrade can only be performed from multispeed slots (slots 1–4 and 14–17) because the STM1-8 and STM4-4 card can only be installed in multispeed slots. Ensure that the STM-1 and STM-4 cards are in multispeed slots before performing a span upgrade to the STM1-8 and STM4-4. The four STM-1 ports will be sequentially mapped to ports 1-4 on the eight-port STM-1 card. The STM-4 port will be mapped to port 1 on the four-port STM-4 card.

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**Stop. You have completed this procedure.**

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