



Upgrading and Maintaining the Cisco 6015 System

This chapter describes upgrade and maintenance procedures for the Cisco 6015 system.

7.1 Backing Up Software

Cisco recommends that you maintain, on a TFTP server, current copies of three files for each Cisco 6015 system:

- The Cisco IOS software image
- The configuration file (running-config)
- The bootflash file

If you keep copies of these files on a TFTP server, you can easily recover from a fault in an NI-2 card. You can simply replace the NI-2 card and download the software image and configuration file from the TFTP server. Remember to update your backup files whenever you change your configuration or upgrade your Cisco IOS software.

Complete the following steps to copy the Cisco IOS software image and configuration file to a TFTP server:

-
- Step 1** Log into the Cisco 6015 node whose software you wish to back up.
- Step 2** Enter the **dir** command to display the names of the files:
- ```
6015# dir
```
- Step 3** Enter a copy command to copy the IOS software file to the node's TFTP server:
- ```
6015# copy flash:<image-name> tftp
```
- Step 4** Enter a second copy command to copy the configuration file to the node's TFTP server:
- ```
6015# copy running-config tftp
```
-

## 7.2 Installing and Replacing Hardware

This section details the installation and removal procedures for the following field replaceable unit (FRU) hardware components:

- Quad-port flexi ATU-C line card (4xflexi)
- Octal-port Discrete Multitone (DMT) ATU-C line card (8xDMT)
- Octal-port DMT ATU-C over ISDN line card (8xDMT over ISDN)
- Octal-port single-pair high-speed digital subscriber line, also known as symmetric high bit-rate digital subscriber loop (G.SHDSL) line card (8xG.SHDSL)
- Blank faceplate
- DS3+T1/E1 inverse multiplexing over ATM (IMA) and industrial temperature (ITEMP) DS3+T1/E1 IMA NI-2 card
- OC-3c/OC-3c NI-2 card
- Network Input/Output (I/O) module
- DSL interface module
- DC power entry module (PEM)
- Fan module
- AC/DC converter



Tip

See the [“General Maintenance Guidelines”](#) section on page 2-9 for installation and replacement practices for the Cisco 6015 system cards and modules.



Caution

Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded using ground straps to eliminate the risk of ESD damage to the equipment. Cards are subject to ESD damage whenever they are removed from the chassis.

See the [“Preventing Electrostatic Discharge Damage”](#) section on page 2-9 for ESD grounding jack locations on the Cisco 6015 system.

### 7.2.1 4xflexi Installation and Removal

The following sections detail the installation and removal procedures for the 4xflexi.

#### 7.2.1.1 Installing a 4xflexi

Complete these steps to install the 4xflexi in the Cisco 6015 chassis.



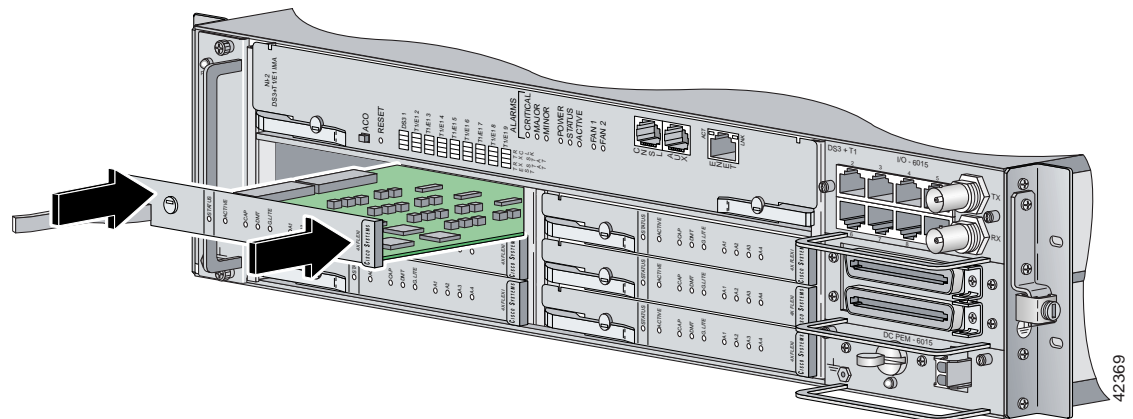
Note

The 4xflexi can be used only in a commercial environment. It cannot be used in an outside-plant environment.

- Step 1 Connect a grounding strap to the ESD grounding jack on the fan module.
- Step 2 Hold the 4xflexi horizontally, with the line card faceplate toward you and the connectors facing the chassis slot.
- Step 3 Horizontally align the line card edge with the guides at the right and left of the slot in the Cisco 6015.
- Step 4 Lift up on the ejector tab and gently apply pressure to the faceplate while pushing the line card into the slot.

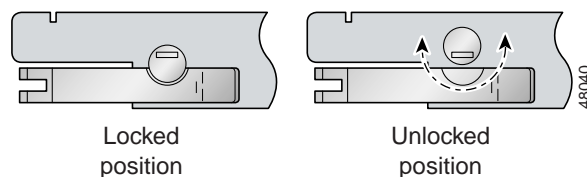
Figure 7-1 shows the 4xflexi installation for a Cisco 6015 chassis.

Figure 7-1 4xflexi Installation in the Cisco 6015



- Step 5 Push on the faceplate of the line card to fully seat the line card.
- Step 6 Press down on the ejector tab to secure the line card and connect it to the backplane.
- Step 7 Use a flat-head screwdriver to turn the locking tab so that it overlaps the line card ejector tab to prevent inadvertent dislodging. Figure 7-2 shows how to position the locking tab.

Figure 7-2 Positioning the Locking Tab on the 4xflexi



- Step 8 Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see Chapter 6, “Troubleshooting,” for troubleshooting procedures.



**Note**

If you are installing the line card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

## 7.2.1.2 Removing a 4xflexi

Complete the following steps to remove a 4xflexi from the Cisco 6015 chassis:

- 
- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
  - Step 2** Use a flat-head screwdriver to move the locking tab from the locked to the unlocked position. Be sure to turn the locking tab so that it does not overlap the line card ejector tab, as shown in [Figure 7-2](#).
  - Step 3** Lift up on the ejector tab. This action disconnects the line card from the backplane.
  - Step 4** Carefully slide the line card out of the slot.

Either replace the 4xflexi that you remove, or insert a blank faceplate in the empty slot. See the [“Installing a 4xflexi”](#) section on page 7-2 for 4xflexi installation procedures. See the [“Installing a Blank Faceplate”](#) section on page 7-10 for blank faceplate installation procedures.




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**Note** Blank faceplates should occupy any empty slots in the chassis.

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## 7.2.2 8xDMT Installation and Removal

The following sections detail the installation and removal procedures for the 8xDMT.

### 7.2.2.1 Installing an 8xDMT

Complete these steps to install the 8xDMT in the Cisco 6015 chassis.




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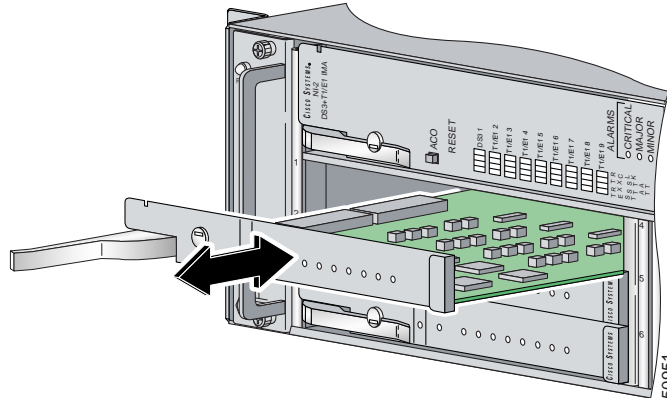
**Note** Install the 8xDMT with part number ATUC-8-DMT-1 only in a commercial environment. Install the 8xDMT with part number ATUC-8-DMT-1-H only in an outside-plant environment.

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- 
- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
  - Step 2** Hold the 8xDMT horizontally, with the line card faceplate toward you and the connectors facing the chassis slot.
  - Step 3** Align the line card edge with the guides at the right and left of the slot in the Cisco 6015.
  - Step 4** Lift up on the ejector tab and gently apply pressure to the faceplate while pushing the line card into the slot.

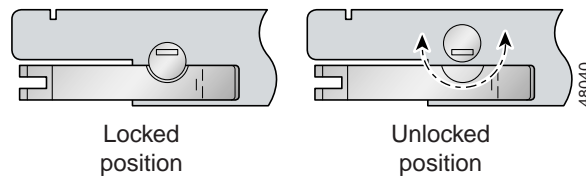
[Figure 7-3](#) shows the 8xDMT installation in a Cisco 6015 chassis.

Figure 7-3 8xDMT Installation in the Cisco 6015



- Step 5** Push on the faceplate of the line card to fully seat the card.
- Step 6** Press down on the ejector tab to secure the line card and connect it to the backplane.
- Step 7** Use a flat-head screwdriver to turn the locking tab so that it overlaps the line card ejector tab to prevent inadvertent dislodging. [Figure 7-4](#) shows how to position the locking tab.

Figure 7-4 Positioning the Locking Tab on the 8xDMT



- Step 8** Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see [Chapter 6, “Troubleshooting,”](#) for troubleshooting procedures.



**Note** If you are installing the line card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

### 7.2.2.2 Removing an 8xDMT

Complete the following steps to remove an 8xDMT from the Cisco 6015 chassis:

- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
- Step 2** Use a flat-head screwdriver to move the locking tab from the locked to the unlocked position. Be sure to turn the locking tab so that it does not overlap the line card ejector tab, as shown in [Figure 7-4](#).
- Step 3** Lift up on the ejector tab. This action disconnects the line card from the backplane.
- Step 4** Carefully slide the line card out of the slot.

Either replace the 8xDMT that you remove, or insert a blank faceplate in the empty slot. See the “Installing an 8xDMT” section on page 7-4 for 8xDMT installation procedures. See the “Installing a Blank Faceplate” section on page 7-10 for blank faceplate installation procedures.



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**Note** Blank faceplates should occupy any empty slots in the chassis.

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## 7.2.3 8xDMT over ISDN Installation and Removal

The following sections detail the installation and removal procedures for the 8xDMT over ISDN.

### 7.2.3.1 Installing an 8xDMT over ISDN

Complete these steps to install the 8xDMT over ISDN in the Cisco 6015 chassis.



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**Note** The 8xDMT over ISDN is designed for use in a commercial environment only.

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The 8xDMT over ISDN is designed for use in a Cisco 6015 with a POTS splitter configuration only.

Reseating the 8xDMT over ISDN during simultaneous DSL and ISDN traffic operation results in the ISDN signal being temporarily interrupted.

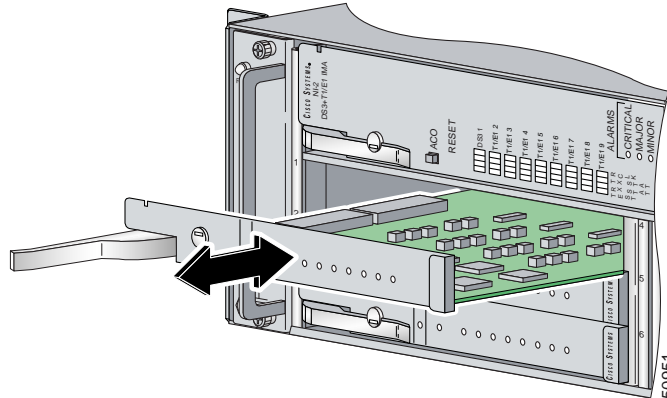
To reseat the 8xDMT over ISDN in the chassis, shut down all the subscriber ports on the line card, wait one minute, and then replace the line card.

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- Step 1** Connect a grounding strap to the ESD grounding jack on the chassis.
  - Step 2** Hold the line card horizontally, with the module faceplate toward you and the connectors facing the chassis slot
  - Step 3** Align the line card edge with the guides at the left and right of the slot in the chassis.
  - Step 4** Lift up on the ejector tab and gently apply pressure to the faceplate while pushing the line card into the slot.

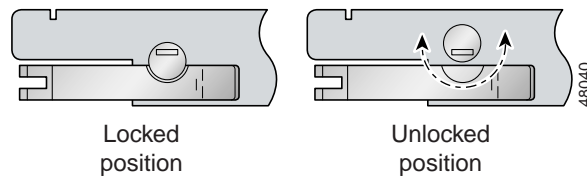
[Figure 7-5](#) shows the 8xDMT over ISDN installation in a Cisco 6015 chassis.

Figure 7-5 8xDMT Over ISDN Installation in the Cisco 6015



- Step 5** Push on the faceplate of the line card until it stops to fully seat the card.
- Step 6** Press down on the ejector tab to secure the line card.
- Step 7** Use a flat-head screwdriver to turn the locking tab so that it overlaps the line card ejector tab to prevent inadvertent dislodging. Figure 7-6 shows how to position the locking tabs.

Figure 7-6 Positioning the Locking Tab on the 8xDMT Over ISDN



- Step 8** Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see the appropriate hardware guide for your chassis for troubleshooting procedures.



**Note** If you are installing the line card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

### 7.2.3.2 Removing an 8xDMT Over ISDN

Complete the following steps to remove an 8xDMT over ISDN from the Cisco 6015 chassis:

- Step 1** Connect a grounding strap to the ESD grounding jack on the chassis.
- Step 2** Use a flat-head screwdriver to move the locking tab from the locked to the unlocked position. Be sure to turn the locking tab so that it does not overlap the line card ejector tab as shown in Figure 7-6.
- Step 3** Lift up on the ejector tab. This action disconnects the line card from the backplane.
- Step 4** Carefully slide the line card out of the slot.

Either replace the line card that you remove, or insert a blank faceplate in the empty slot. See the [“Installing an 8xDMT over ISDN” section on page 7-6](#) for 8xDMT over ISDN installation instructions. See the [“Installing a Blank Faceplate” section on page 7-10](#) for blank faceplate installation instructions.



**Note** Blank faceplates should occupy any empty slots in the chassis.

## 7.2.4 8xG.SHDSL Installation and Removal

The following sections detail the installation and removal procedures for the 8xG.SHDSL.



**Note**

The 8xG.SHDSL can be used only in a commercial environment. It cannot be used in an outside-plant environment.

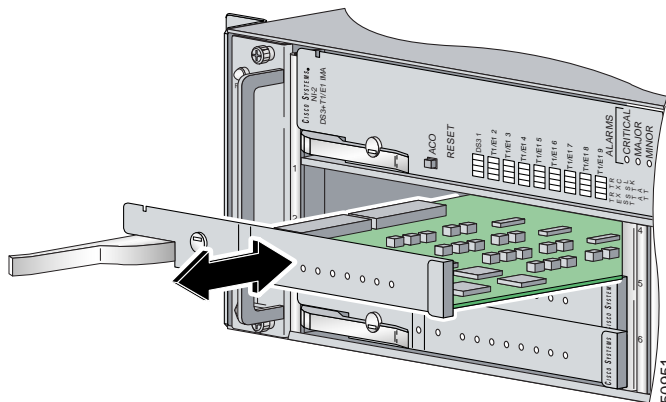
### 7.2.4.1 Installing an 8xG.SHDSL

Complete the following steps to install the 8xG.SHDSL in the Cisco 6015 chassis:.

- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
- Step 2** Hold the 8xG.SHDSL horizontally, with the line card faceplate toward you and the connectors facing the chassis slot.
- Step 3** Align the line card edge with the guides at the right and left of the slot in the Cisco 6015.
- Step 4** Lift up on the ejector tab and gently apply pressure to the faceplate while pushing the line card into the slot.

[Figure 7-7](#) shows the 8xG.SHDSL installation in a Cisco 6015 chassis.

*Figure 7-7 8xG.SHDSL Installation in the Cisco 6015*





**Step 5** Push on the faceplate of the line card to fully seat the line card.

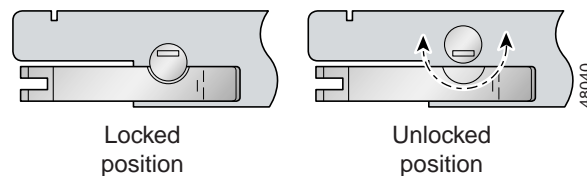


**Note** The card must be properly seated in its slot to maintain the EMI emissions containment. Apply gentle pressure if needed to ensure that the board is properly seated.

**Step 6** Press down on the ejector tab to secure the line card and connect it to the backplane.

**Step 7** Use a flat-head screwdriver to turn the locking tab so that it overlaps the line card ejector tab to prevent inadvertent dislodging. [Figure 7-4](#) shows how to position the locking tab.

**Figure 7-8 Positioning the Locking Tab on the 8xG.SHDSL**



**Step 8** Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see [Chapter 6, “Troubleshooting,”](#) for troubleshooting procedures.



**Note** If you are installing the line card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

## 7.2.4.2 Removing an 8xG.SHDSL

Complete the following steps to remove an 8xG.SHDSL from the Cisco 6015 chassis:

**Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.

**Step 2** Use a flat-head screwdriver to move the locking tab from the locked to the unlocked position. Be sure to turn the locking tab so that it does not overlap the line card ejector tab, as shown in [Figure 7-4](#).

**Step 3** Lift up on the ejector tab. This action disconnects the line card from the backplane.

**Step 4** Carefully slide the line card out of the slot.

Either replace the 8xG.SHDSL that you remove, or insert a blank faceplate in the empty slot. See the [“Installing an 8xG.SHDSL”](#) section on page 7-8 for 8xG.SHDSL installation procedures. See the [“Installing a Blank Faceplate”](#) section on page 7-10 for blank faceplate installation procedures.



**Note** Blank faceplates should occupy any empty slots in the chassis.

## 7.2.5 Blank Faceplate Installation and Removal

Blank faceplates should occupy any empty line card slots in the Cisco 6015 chassis. Blank faceplate installation is similar to line card installation.

The following sections detail the installation and removal procedures for a blank faceplate.

### 7.2.5.1 Installing a Blank Faceplate

Complete the following steps to install a blank faceplate in the Cisco 6015 chassis:

- 
- Step 1 Connect a grounding strap to the ESD grounding jack on the fan module.
  - Step 2 Horizontally align the blank faceplate edge with the guides at the left and right of the slot.
  - Step 3 Lift up on the ejector tab and gently apply pressure to the faceplate while pushing the blank faceplate into the slot.
  - Step 4 Push on the faceplate to fully seat the blank faceplate.
  - Step 5 Press down on the ejector tab to secure the faceplate.
- 

### 7.2.5.2 Removing a Blank Faceplate

Complete the following steps to remove a blank faceplate from the Cisco 6015 chassis:

- 
- Step 1 Connect a grounding strap to the ESD grounding jack on the fan module.
  - Step 2 Lift up on the ejector tab. This action disconnects the line card from the backplane.
  - Step 3 Carefully slide the line card out of the slot.

Either replace the blank faceplate that you remove, or insert a line card in the empty slot. See the [“Installing a Blank Faceplate” section on page 7-10](#) for blank faceplate installation procedures. For line card installation procedures, see either the [“Installing a 4xflexi” section on page 7-2](#) or the [“Installing an 8xDMT” section on page 7-4](#).

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## 7.2.6 DS3+T1/E1 IMA or ITEMP DS3+T1/E1 IMA NI-2 Card Installation and Removal

The following sections detail the installation and removal procedures for the NI-2 card.



Warning

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The ports labeled "ENET," "CNSL," and "AUX" are SELV circuits. SELV circuits should be connected only to other SELV circuits. Because the DSL circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the TNV circuits.

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Tip

Cisco recommends that you label each data cable at both ends to identify its destination.



Caution

Service is interrupted for the entire system when the NI-2 card is removed.

### 7.2.6.1 Installing a DS3+T1/E1 IMA or ITEMP DS3+T1/E1 IMA NI-2 Card

Complete these steps to install the NI-2 card in the Cisco 6015 chassis.



Note

The DS3+T1/E1 IMA NI-2 card is used in a commercial environment. The ITEMP DS3+T1/E1 IMA NI-2 card is used in an outside-plant environment.



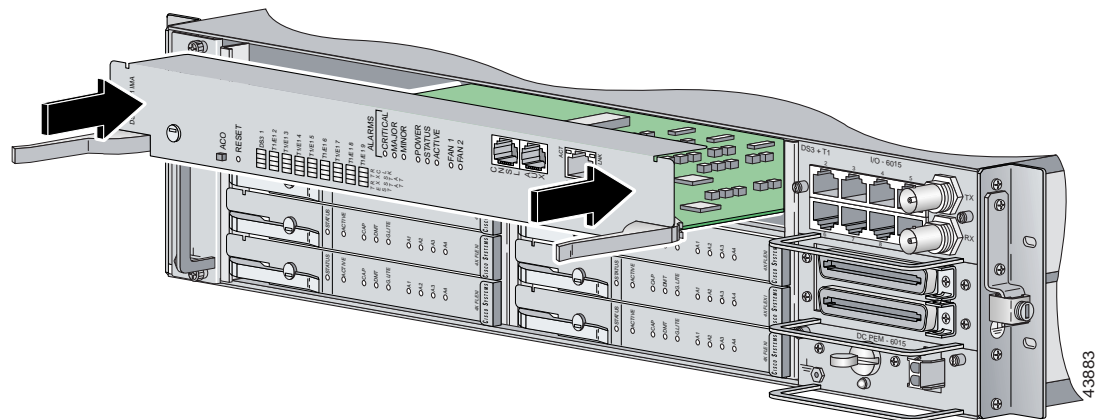
Tip

Cisco recommends that you label each data cable at both ends to identify its destination.

- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
- Step 2** Hold the NI-2 card horizontally, with the faceplate toward you and the connectors facing the chassis slot.
- Step 3** Horizontally align the card edge with the guides at the right and left of the slot in the Cisco 6015.
- Step 4** Lift up on the ejector tabs and gently apply pressure to the faceplate while pushing the card into the slot.

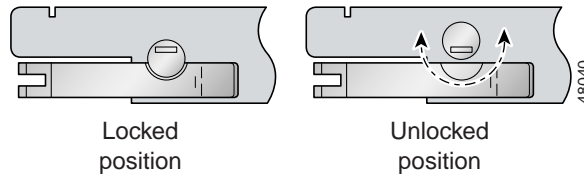
[Figure 7-9](#) shows the module installation in a Cisco 6015 chassis.

**Figure 7-9 NI-2 Card Installation in the Cisco 6015**



- Step 5** Push on the faceplate of the card to fully seat the card.
- Step 6** Press down on the ejector tabs to secure the card and connect it to the backplane.
- Step 7** Use a flat-head screwdriver to turn the locking tabs so that they overlap the NI-2 card ejector tabs to prevent inadvertent dislodging. [Figure 7-10](#) shows how to position the locking tabs.

Figure 7-10 Positioning the Locking Tab on the NI-2 Card



- Step 8** Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see [Chapter 6, “Troubleshooting,”](#) for troubleshooting procedures.

**Note**

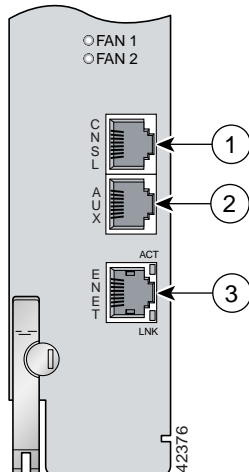
If you are installing the line card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

- Step 9** Connect the Ethernet cable to the management network.
- Connect the 10BaseT RJ-45 connector to the NI-2 card (ENET). [Figure 7-11](#) shows where to connect the Ethernet cable.

**Note**

See [Table 2-6 on page 2-19](#) for cable and ferrite requirements.

Figure 7-11 ENET, CNSL, and AUX RJ-45 Receptacles on the DS3+T1/E1 IMA NI-2 Card



|   |                |   |               |
|---|----------------|---|---------------|
| 1 | Console port   | 3 | Ethernet port |
| 2 | Auxiliary port |   |               |

- Run the cable through the ferrite one time, loop the cable back through the ferrite, and clamp the ferrite shut.
  - Connect the other end of the cable to the management network (for example, a LAN).
- Step 10** Connect a VT100-compatible terminal to the system console port on the NI-2 card (CNSL). Connect the terminal to a power source and set it up using the values that are shown in [Table 7-1](#). [Figure 7-11](#) shows where to connect the console cable.

**Table 7-1 Terminal Settings**

|                |                             |
|----------------|-----------------------------|
| Baud rate      | 9600 (transmit and receive) |
| Character size | 8 bits                      |
| Parity         | None                        |
| Stop bits      | 1                           |
| Flow control   | None                        |

- Step 11** Connect a terminal, a modem, or another serial device to the auxiliary port on the NI-2 card (AUX). [Figure 7-11](#) shows where to connect the auxiliary cable.



**Note** This step is optional.

### 7.2.6.2 Removing a DS3+T1/E1 IMA or ITEMP DS3+T1/E1 IMA NI-2 Card

Complete these steps to remove an NI-2 card from the Cisco 6015 chassis.



**Note** The DS3+T1/E1 IMA NI-2 card is used in a commercial environment. The ITEMP DS3+T1/E1 IMA NI-2 card is used in an outside-plant environment.

- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
- Step 2** Disconnect the RJ-45 connector from the auxiliary port on the NI-2 card (AUX).
- Step 3** Disconnect the VT100-compatible terminal connector from the system console port on the NI-2 card (CNSL).
- Step 4** Disconnect the 10BaseT RJ-45 connector from the ethernet port on the NI-2 card (ENET).
- Step 5** Use a flat-head screwdriver to move the locking tabs from the locked to the unlocked position. Be sure to turn the locking tabs so that they do not overlap the NI-2 ejector tabs, as shown in [Figure 7-10](#).
- Step 6** Lift up on the ejector tabs. This action disconnects the card from the backplane.
- Step 7** Carefully slide the card out of the slot.
- See the “[Installing a DS3+T1/E1 IMA or ITEMP DS3+T1/E1 IMA NI-2 Card](#)” section on page 7-11 for NI-2 card installation procedures.

## 7.2.7 OC-3c/OC-3c NI-2 Card Installation and Removal

Complete these steps to install the NI-2 card in the Cisco 6015 chassis.



**Warning**

The ports labeled "ENET," "CNSL," and "AUX" are SELV circuits. SELV circuits should be connected only to other SELV circuits. Because the DSL circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the TNV circuits.



**Tip**

Cisco recommends that you label each data cable at both ends to identify its destination.



**Caution**

Service is interrupted for the entire system when the NI-2 card is removed.



**Caution**

Installing the cards in the chassis with the power leads reversed can damage the cards.



**Warning**

Do not stare into the beam or view it directly with optical instruments.

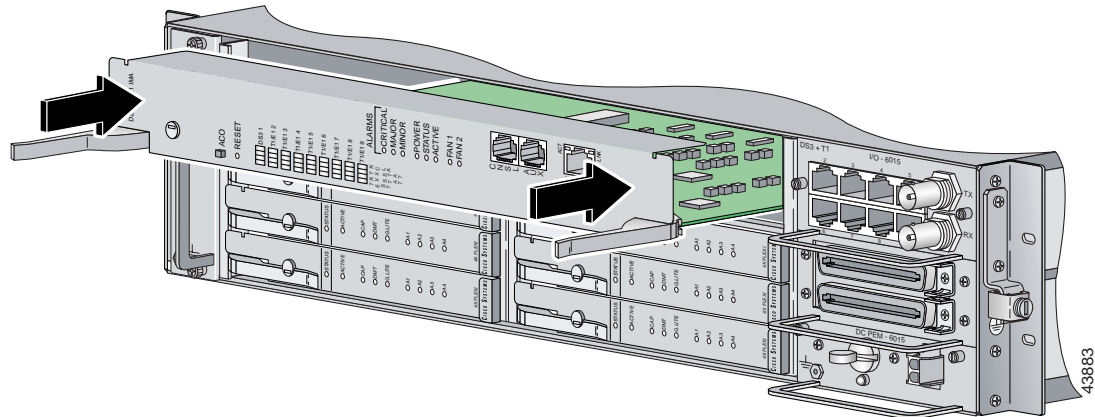
### 7.2.7.1 Installing an OC-3c/OC-3c NI-2 Card

Complete the following steps to install an OC-3c/OC-3c NI-2 card in the chassis. It is important that you complete each step before moving on to the next step.

- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2** Hold the NI-2 card horizontally, with the faceplate toward you and the connectors facing the chassis slot.
- Step 3** Horizontally align the card edge with the guides at the right and left of the slot in the Cisco 6015.
- Step 4** Lift up on the ejector tabs and gently apply pressure to the faceplate while pushing the card into the slot.

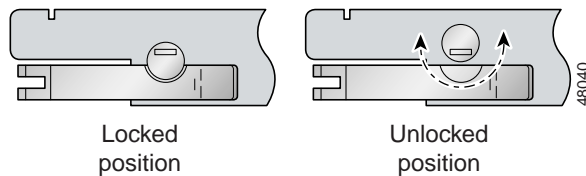
[Figure 7-12](#) shows the module installation in a Cisco 6015 chassis.

Figure 7-12 NI-2 Card Installation in the Cisco 6015



- Step 5** Push on the faceplate of the card to fully seat the card.
- Step 6** Press down on the ejector lever to secure the card and connect it to the backplane.
- Step 7** Use a flat-head screwdriver to turn the locking tabs so that they overlap the NI-2 card ejector levers to prevent inadvertent dislodging. Use a flat-head screwdriver to turn the locking tab so that it overlaps the NI-2 card to prevent inadvertent dislodging, as shown in [Figure 7-13](#).

Figure 7-13 Positioning the Locking Tab on the NI-2 Card



- Step 8** Verify that the STATUS LED is solid green after the brief self-test. If the STATUS LED is not green after the self-test, see [Chapter 6, “Troubleshooting,”](#) for troubleshooting procedures.



**Note** If you are installing the NI-2 card for the first time, refer to the provisioning procedures in the *Configuration Guide for Cisco DSLAMs with NI-2*.

- Step 9** Attach the RX cable from the ATM switch to the TX connector in the inset on the faceplate of the OC-3c/OC-3c NI-2 card (trunk 1 interface connector TX).

The TX connector is the one closer to the top of the faceplate. The RX connector is closer to the bottom of the faceplate. The connector IDs are silkscreened inside the inset.

- Step 10** Attach the TX cable from the ATM switch to the RX connector in the inset on the faceplate of the OC-3c/OC-3c NI-2 card (trunk 1 interface connector RX).



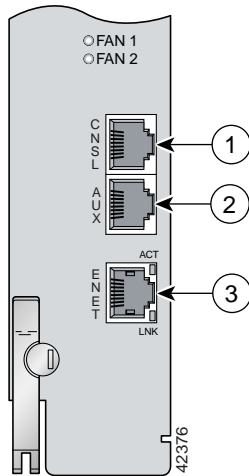
**Note** To cable the chassis for OC-3c subtending, see the appropriate installation chapter for your system.

- Step 11** Connect the Ethernet to the management network.
- Connect an Ethernet cable to the 10BaseT RJ-45 port (ENET) on the OC-3c/OC-3c NI-2 card faceplate. [Figure 7-14](#) shows where to connect the Ethernet cable.



**Note** See the [Table 2-6 on page 2-19](#) for cable and ferrite requirements.

*Figure 7-14 CNSL, AUX, and ENET RJ-45 Receptacles on the OC-3c/OC-3c NI-2 Card*



|   |                |   |               |
|---|----------------|---|---------------|
| 1 | Console port   | 3 | Ethernet port |
| 2 | Auxiliary port |   |               |

- Run the Ethernet cable through the ferrite one time, loop the cable back through the ferrite, and clamp the ferrite shut.
- Step 12** Connect the other end of the cable to the management network (for example, a LAN).
- Step 13** Connect a VT100-compatible terminal to the system console port on the NI-2 card (CNSL). Connect the terminal to a power source and set it up using the values that are shown in [Table 7-1](#). [Figure 7-14](#) shows where to connect the console cable.



**Note** This step is optional.

- Step 14** Connect a terminal, a modem, or another serial device to the RJ-45 auxiliary port on the NI-2 card (AUX). [Figure 7-14](#) shows where to connect the auxiliary cable.



### 7.2.7.2 Removing an OC-3c/OC-3c NI-2 Card

Complete the following steps to remove an OC-3c/OC-3c NI-2 card from the chassis. It is important that you complete each step before moving on to the next step.

- 
- Step 1** Connect a grounding strap to the ESD grounding jack on the fan module.
  - Step 2** Disconnect the cable connected to the RJ-45 auxiliary port (AUX) on the NI-2 card, as necessary.
  - Step 3** Disconnect the cable connected to the VT100-compatible terminal from the system console port (CNSL) on the NI-2 card, as necessary.
  - Step 4** Disconnect the cable connected to the 10BaseT RJ-45 port (ENET) on the NI-2 card, as necessary.
  - Step 5** Disconnect the RX cable from the TX connector in the inset on the faceplate of the NI-2 card (trunk 1 interface connector TX).
  - Step 6** Disconnect the TX cable from the RX connector in the inset on the faceplate of the NI-2 card (trunk 1 interface connector RX).
  - Step 7** Disconnect the RX subtend 2 interface connector in the inset on the faceplate of the NI-2 card, if necessary.
  - Step 8** Disconnect the TX subtend 2 interface connector in the inset on the faceplate of the NI-2 card, if necessary.
  - Step 9** Use a flat-head screwdriver to move the locking tabs on the faceplate from the locked to the unlocked position. Be sure to turn the locking tabs so that they do not overlap the NI-2 card locking levers, as shown in [Figure 7-10](#).
  - Step 10** Lift up on the locking levers. This action disconnects the card from the backplane.
  - Step 11** Carefully slide the card out of the slot.

See the [“Installing an OC-3c/OC-3c NI-2 Card”](#) section on page 7-14 for NI-2 card installation procedures.

---

## 7.2.8 I/O Module Installation and Removal

The following sections detail the installation and removal procedures for the I/O module.



**Tip**

Cisco recommends that you label each data cable at both ends to identify its destination.

---



**Tip**

The term *subtending* refers to the host chassis, and *subtended* refers to the downstream chassis in a subtended network.

---

## 7.2.8.1 Installing an I/O Module

Complete the following steps to install the I/O module in the Cisco 6015 chassis:

- 
- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2** Power off the Cisco 6015.
- If you are using AC power and the power cord is plugged into the wall outlet, unplug it.
  - If you are using DC power and the fuses are installed in the fuse and alarm panel, remove them. You can replace the fuses after the system is installed and connected.



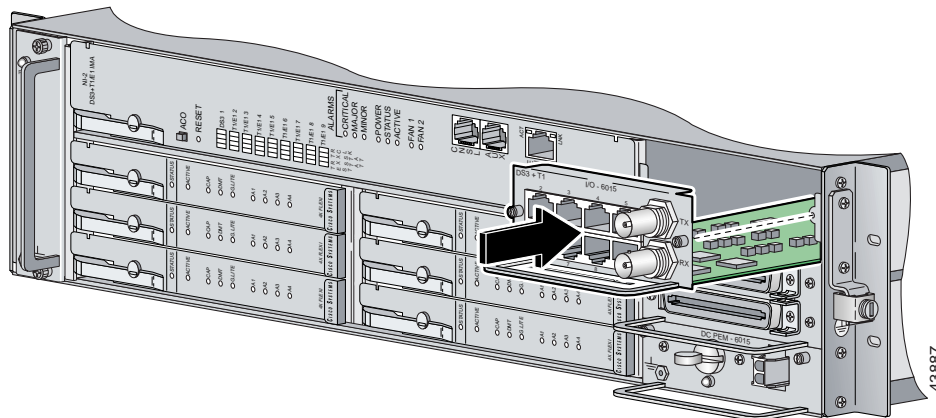
**Note** The fuse and alarm panel is not provided by Cisco.

---

- Set the circuit breaker on the DC PEM to the OFF (0) position.
- Step 3** Horizontally align the module edge with the module guides at the right and left of the slot in the Cisco 6015.

Figure 7-15 shows the I/O module installation.

*Figure 7-15 I/O Module Installation*



- Step 4** Hold the handle on the front of the module and gently apply pressure while pushing the module into the slot.
- Step 5** Push on the faceplate of the module to fully seat the module.
- Step 6** Use a flat-head or Phillips-head screwdriver to attach the two I/O module screws to the Cisco 6015 chassis.
- Step 7** If you are installing a subtended network, complete the following steps. If you are not installing a subtended network, proceed to [Step 8](#).



**Note** For more information on a subtended network configuration, see the “[Subtended Network Configuration](#)” section on page 1-6.

If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

- a. Connect one end of an RJ-48 cable to one of the RJ-48 receptacles on the I/O module in the subtending host chassis.
- b. Connect the other end of the cable to one of the RJ-48 receptacles on the I/O module in a subtended node chassis.
- c. Repeat [Step 7a](#) and [Step 7b](#) to connect the subtending host chassis to each subtended node chassis.



**Note** If you are using a T1 or E1 trunk to the network, the trunk connection will originate at one of the eight RJ-48 receptacles on the I/O module. Therefore, you can subtend only seven node chassis.

- Step 8** Complete the following steps to connect the DS3+T1 I/O module to the network using a DS3 connection. If you are using a T1 connection, proceed to [Step 9](#); if you are using an E1 connection, proceed to [Step 10](#).
- a. Verify that you have a DS3+T1 I/O module installed in the Cisco 6015 chassis. The I/O module DS3 connections attach to the ATM switch. Two 75-ohm DS3 Bayonet-Neill-Concelman (BNC) connectors are provided for DS3 TX and RX. Attach one end of a coaxial cable (type 734A or equivalent) to the TX DS3 BNC connector on the I/O module.
  - b. Attach the other end of the cable that originates at the TX DS3 BNC connector to the RX DS3 BNC connector on the ATM switch.
  - c. Attach one end of a coaxial cable (type 734A or equivalent) to the RX DS3 BNC connector on the I/O module.
  - d. Attach the other end of the cable that originates at the RX DS3 BNC connector to the TX DS3 BNC connector on the ATM switch.
- Step 9** Complete the following steps to connect the DS3+T1 I/O module to the network using a T1 connection. If you are using an E1 connection, proceed to [Step 10](#).
- a. Verify that you have a DS3+T1 I/O module installed in the Cisco 6015 chassis.
  - b. Connect one end of an RJ-48 cable to one of the RJ-48 receptacles on the I/O module. If you have a subtended network configuration installed, this connection must be made from the I/O module in the subtending host chassis.



**Note** If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

- c. Connect the other end of the cable to the ATM switch.

- Step 10** Complete the following steps to connect the E1 I/O module to the network using an E1 connection:
- a. Verify that you have an E1 I/O module installed in the Cisco 6015 chassis.
  - b. Connect one end of an RJ-48 cable to one of the RJ-48 receptacles on the I/O module. If you have a subtended network configuration installed, this connection must be made from the I/O module in the subtending host chassis.



**Note** If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

c. Connect the other end of the cable to the ATM switch.

**Step 11** Plug the AC power cord into the wall outlet or reinsert the fuses in the fuse and alarm panel.

**Step 12** Set the circuit breaker on the DC PEM to the ON (1) position.

## 7.2.8.2 Removing an I/O Module

Complete the following steps to remove an I/O module from the Cisco 6015 chassis:



**Note** If you are using AC power and the power cord is plugged into the wall outlet, unplug it.

If you are using DC power and the fuses are installed in the fuse and alarm panel, remove them. You can replace the fuses after the system is installed and connected.

The fuse and alarm panel is not provided by Cisco.

**Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.

**Step 2** Set the circuit breaker on the DC PEM to the OFF (0) position.

**Step 3** Disconnect the two DS3 BNC connections from the front of the I/O module, as necessary.

**Step 4** Disconnect the T1 or E1 RJ-48 cables from the RJ-48 receptacles on the front of the I/O module, as necessary.

**Step 5** Use a flat-head or Phillips-head screwdriver to unscrew the two screws that hold the I/O module to the Cisco 6015 chassis.

**Step 6** Hold the extraction handle on the front of the module and carefully slide the module out of the slot.

See the [“Installing an I/O Module” section on page 7-18](#) for I/O module installation procedures.

## 7.2.9 DSL Interface Module Installation and Removal

The following sections detail the installation and removal procedures for the DSL interface module.



**Note** If you are using AC power and the power cord is plugged into the wall outlet, unplug it.

If you are using DC power and the fuses are installed in the fuse and alarm panel, remove them. You can replace the fuses after the system is installed and connected.

The fuse and alarm panel is not provided by Cisco.



Tip

Cisco recommends that you label each data cable at both ends to identify its destination.

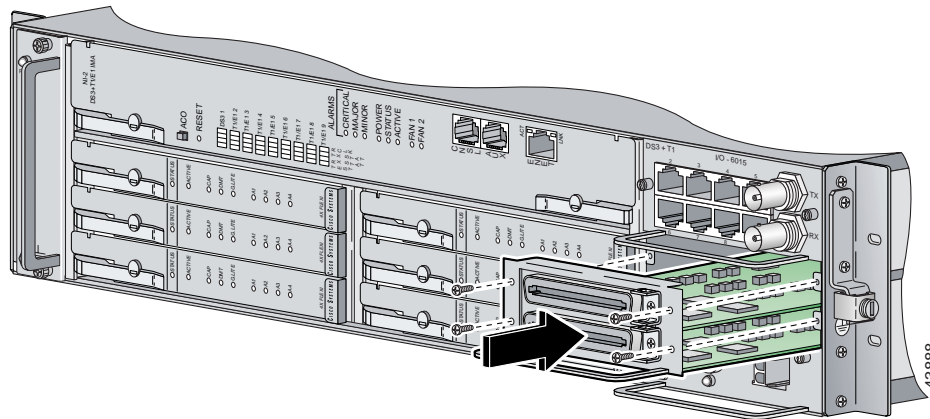
## 7.2.9.1 Installing a DSL Interface Module

Complete the following steps to install the DSL interface module in the Cisco 6015 chassis:

- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2** Set the circuit breaker on the DC PEM to the OFF (0) position.
- Step 3** Horizontally align the module edge with the module guides at the right and left of the slot in the Cisco 6015.

Figure 7-16 shows the DSL interface module installation.

**Figure 7-16** DSL Interface Module Installation



- Step 4** Hold the extraction handle on the front of the module and gently apply pressure while carefully pushing the module into the slot.
- Step 5** Push on the faceplate of the module to fully seat the module.
- Step 6** Use a flat-head or Phillips-head screwdriver and four screws to attach the DSL interface module to the Cisco 6015 chassis.
- Step 7** Connect the DSL interface module to the POTS splitter (Cisco 6015 with a POTS splitter configuration) or MDF (Cisco 6015 without a POTS splitter configuration).

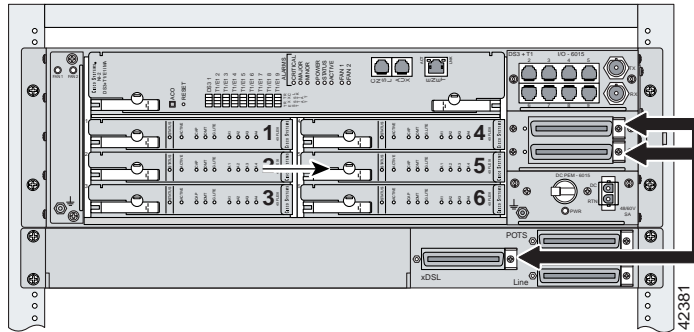
Use the cables that are described in the “[Required Tools and Equipment](#)” section on [page 2-19](#) to connect the DSL interface module to the POTS splitter or MDF. For cabling procedures for each POTS splitter, refer to the appropriate vendor documentation.



**Note** If unshielded cable is used for FCC Class A or EN55022 Class A compliance, the cables will need to be looped through ferrites.

Figure 7-17 shows the cabling between the DSL interface module and a third-party POTS splitter. These connections are for xDSL data flow between the Cisco 6015 and the POTS splitter.

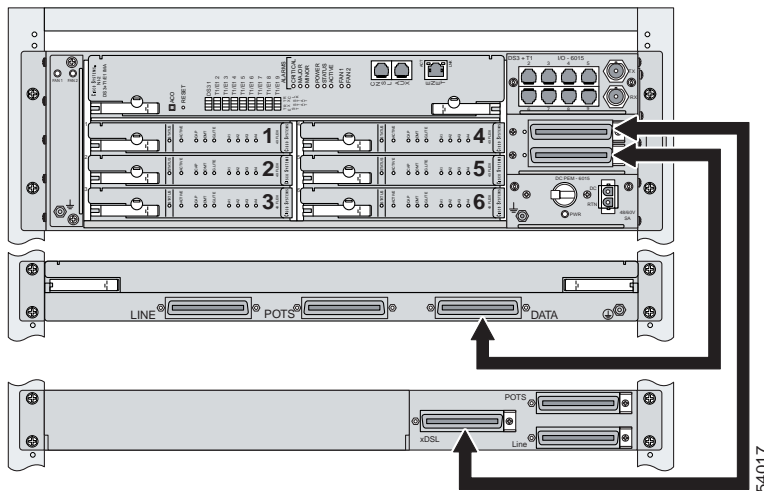
Figure 7-17 Connecting the DSL Interface Module to the POTS Splitter



A system configuration using 8xDMT or 8xDMT over ISDNs requires the installation of an additional POTS splitter. The additional POTS splitter expands the system capacity to 48 subscriber ports.

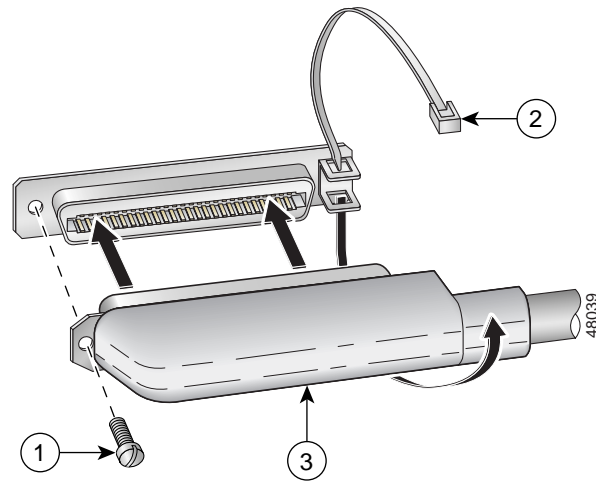
Figure 7-18 shows the cabling between the DSL interface module and two third-party POTS splitters. These connections are for xDSL data flow between the Cisco 6015 and the POTS splitters.

Figure 7-18 Connecting the DSL Interface Module to Two POTS Splitters



- Step 8** Use a flat-head screwdriver to screw in the Champ connectors, and tie wrap the connector to the chassis, as shown in [Figure 7-19](#).

Figure 7-19 Attaching the Champ Connector to the Chassis



|   |                       |   |                 |
|---|-----------------------|---|-----------------|
| 1 | Champ connector screw | 3 | Champ connector |
| 2 | Tie wrap              |   |                 |

- Step 9** Plug the AC power cord into the wall outlet or reinsert the fuses in the fuse and alarm panel.
- Step 10** Set the circuit breaker on the DC PEM to the ON (1) position.

### 7.2.9.2 Removing a DSL Interface Module

Complete the following steps to remove a DSL interface module from the Cisco 6015 chassis:

- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2** Set the circuit breaker on the DC PEM to the OFF (0) position.
- Step 3** Disconnect the two Champ connector cables from the front of the DSL interface module.
- Step 4** Use a flat-head or Phillips-head screwdriver to unscrew the four screws that hold the DSL interface module to the Cisco 6015 chassis.
- Step 5** Hold the extraction handle on the front of the module and firmly pull the module out of the slot.
- See the [“Installing a DSL Interface Module”](#) section on page 7-21 for DSL interface module installation procedures.

## 7.2.10 DC PEM Installation and Removal

The following sections detail the installation and removal procedures for the DC PEM.

### 7.2.10.1 Installing a DC PEM

Complete the following steps to install the DC PEM in the Cisco 6015 chassis:



#### Note

If you are using AC power and the power cord is plugged into the wall outlet, unplug it.

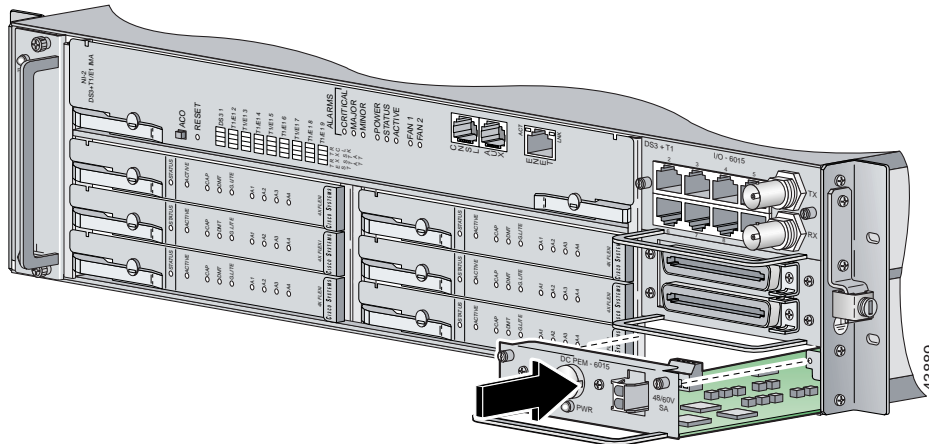
If you are using DC power and the fuses are installed in the fuse and alarm panel, remove them. You can replace the fuses after the system is installed and connected.

The fuse and alarm panel is not provided by Cisco.

- Step 1 Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2 Set the circuit breaker on the DC PEM to the OFF (0) position.
- Step 3 Horizontally align the module edge with the module guides at the right and left of the slot in the Cisco 6015.

Figure 7-20 shows the DC PEM installation.

*Figure 7-20 DC PEM Installation*



- Step 4 Hold the extraction handle on the front of the module and gently apply pressure while carefully pushing the module into the slot.



#### Note

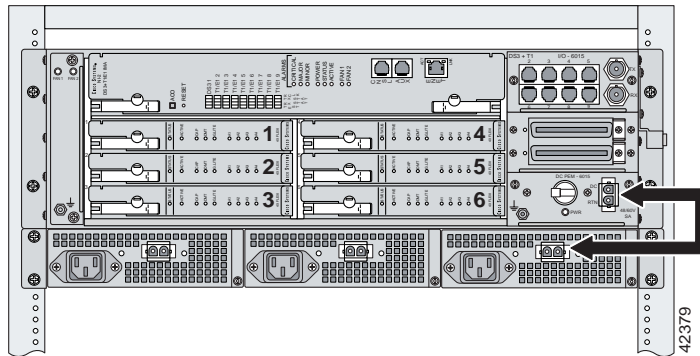
Forcefully inserting the DC PEM in the slot could cause damage to the EMI gasketing located on the top of the faceplate.

- Step 5 Push on the faceplate of the module to fully seat the module.
- Step 6 Use a flat-head or Phillips-head screwdriver and two screws to attach the DC PEM to the Cisco 6015 chassis.



- Step 7** If you are using AC power, connect the DC PEM to the AC/DC converter.
- Attach one end of the DC power cable (part number 72-2178-01) to the DC PEM, as shown in [Figure 7-21](#).

*Figure 7-21 Connecting the DC PEM to the AC/DC Converter*



- Attach the other end of the cable to the AC/DC converter, as shown in [Figure 7-21](#).
- Attach the AC power cord to the AC/DC converter.

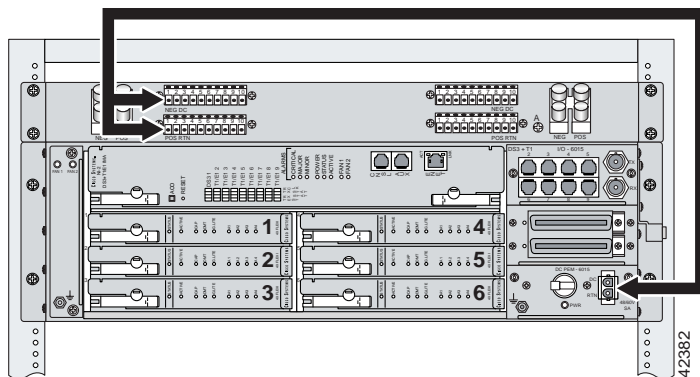


**Caution**

If the power connections are improperly connected and power is applied while the cards are installed, the cards and chassis could be damaged.

- Step 8** If you are using DC power, connect the DC PEM to the fuse and alarm panel.
- Attach one end of the DC power cable (part number 72-2223-01) to the DC PEM, as shown in [Figure 7-22](#).

*Figure 7-22 Connecting the DC PEM to the Fuse and Alarm Panel*



- Attach the red wire coming from the DC PEM to a fuse and alarm panel POS (positive) DC connector, as shown in [Figure 7-22](#).
- Attach the black wire coming from the DC PEM to a fuse and alarm panel NEG (negative) DC connector, as shown in [Figure 7-22](#).




---

**Note** Connect each Cisco 6015 system component to a separate fuse. Do not power the components in the rack by chaining them together.

See the [“DC Power” section on page 2-16](#) for the calculation tables that are necessary to determine the minimum power requirement for each component that is wired to the fuse and alarm panel.

---

- Step 9** Plug the AC power cord into the wall outlet or reinsert the fuses in the fuse and alarm panel.
- Step 10** Set the circuit breaker on the DC PEM to the ON (1) position.
- Step 11** Verify that the DC PEM is operational by locating the LEDs on the front of the DC PEM. If the LED is
- Green—Output is correct.
  - Off—DC PEM is not operational. See the [“DC PEM Problems” section on page 6-16](#) for troubleshooting procedures.
- Step 12** Verify that the AC/DC converter is operational by locating the LEDs on the front of the AC/DC converter.
- If the left LED is green, this indicates that there is good AC input.
  - If the right LED is green, this indicates that there is good DC output between the AC/DC converter and the DC PEM.
  - If either LED is off, troubleshoot the AC/DC converter or the AC input.
- 

## 7.2.10.2 Removing a DC PEM

Complete the following steps to remove a DC PEM from the Cisco 6015 chassis:

- 
- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the fan module.
- Step 2** Set the circuit breaker on the DC PEM to the OFF (0) position.
- Step 3** Unplug the power cord from the wall outlet, if you are using AC power.
- Step 4** Remove the fuses from the fuse and alarm panel, if you are using DC power.
- Step 5** Disconnect the cable that runs from either the fuse and alarm panel or the AC/DC converter to the DC PEM.
- Step 6** Use a flat-head or Phillips-head screwdriver to unscrew the two screws that hold the DC PEM to the Cisco 6015 chassis
- Step 7** Hold the extraction handle on the front of the module and carefully slide the module out of the slot.
- See the [“Installing a DC PEM” section on page 7-24](#) for DC PEM installation procedures.
-

## 7.2.11 Fan Module Installation and Removal

The following sections detail the installation and removal procedures for the fan module.

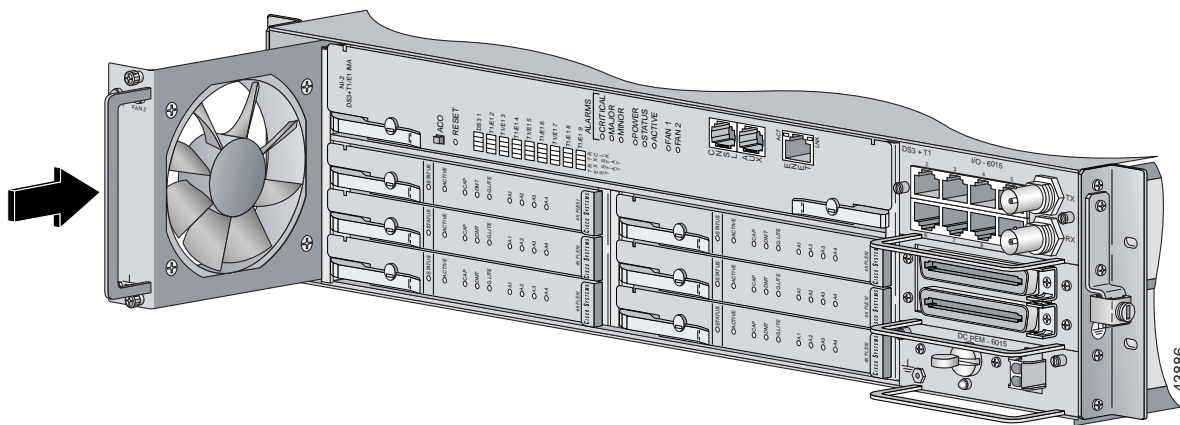
### 7.2.11.1 Installing the Fan Module

Complete the following steps to install the fan module in the Cisco 6015 chassis:

- 
- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the DC PEM.
  - Step 2** Vertically align the module edge with the module guides at the top and bottom of the slot in the Cisco 6015.

[Figure 7-23](#) shows the fan module installation.

*Figure 7-23 Fan Module Installation in the Cisco 6015*



- Step 3** Hold the extraction handle on the right side of the module and gently apply pressure while pushing the module into the slot.
  - Step 4** Push on the faceplate of the module to fully seat the module.
  - Step 5** Align the two screws that are located at the top and bottom of the module with the screw holes in the Cisco 6015 chassis.
  - Step 6** Use a flat-head or Phillips-head screwdriver to tighten the screws to secure the fan module.
  - Step 7** Verify that the LEDs on the fan module are solid green once the module is installed and secured. If the LEDs are not green, see [Chapter 6, “Troubleshooting,”](#) for troubleshooting procedures.
- 

### 7.2.11.2 Removing the Fan Module

Complete the following steps to remove the fan module from the Cisco 6015 chassis:

- 
- Step 1** Connect a grounding strap to the ESD grounding jack that is located on the DC PEM.
  - Step 2** Use a flat-head or Phillips-head screwdriver to unscrew the two screws that hold the fan module to the Cisco 6015 chassis.

**Step 3** Hold the extraction handle on the right side of the module and carefully slide the module out of the slot.



**Caution**

---

The Cisco 6015 requires that a fan module be installed when the system is in operation. See the [“Installing the Fan Module” section on page 7-27](#) for fan module installation procedures.

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## 7.2.12 AC/DC Converter Installation and Removal

For installation and removal procedures for the AC/DC converter, refer to the AC/DC converter documentation.