
# Installing a Cisco 6015 Configuration in an Outside-Plant Environment

This chapter provides installation procedures for a Cisco 6015 configuration in an outside-plant environment, using a Cisco 6015 with a POTS splitter configuration or a Cisco 6015 without a POTS splitter configuration.

**Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

**Caution** Before you start the installation procedures, read the entire chapter for important information and safety warnings.

**Note** Before installing and cabling the equipment, be aware of standard safety practices and the hazards involved in working with electrical circuitry to prevent accidents. See the "Safety Requirements" section on page 2-1 for all cautions and warnings that are necessary to ensure a safe and hazard-free installation.

To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information for the Cisco 6015 System*.

**Tip** See the "Cisco 6015 with a POTS Splitter Configuration" section on page 1-5 or the "Cisco 6015 Without a POTS Splitter Configuration" section on page 1-6 for more information about Cisco 6015 configuration components in an outside-plant environment.

## 5.1 Installation Checklist

When you install a Cisco 6015 configuration (with or without a POTS splitter) in an outside-plant environment, be sure that you follow the installation procedures in the proper sequence. Table 5-1 is a checklist of the installation steps in the order in which they should occur. Detailed installation instructions are discussed in the sections following Table 5-1.

*Table 5-1 Installation Checklist—Cisco 6015 Configuration in an Outside-Plant Environment*

| Check | Installation Procedure |
|---|---|
| | **1.** Verify the remote terminal enclosure compliance. |
| | **2.** Verify the cooling capacity of the heat exchanger or air conditioner that is installed in the enclosure. |
| | **3.** Verify and measure the rack space for the Cisco 6015 chassis and POTS splitter(s) (if applicable). |
| | **4.** Install the POTS splitter(s) in the rack (applicable in a Cisco 6015 with a POTS splitter configuration). |
| | **5.** Attach the BITS[1] interface wire, if applicable. |
| | **6.** Attach the facility alarm input wire, if applicable. |
| | **7.** Install the Cisco 6015 chassis in the rack. |
| | **8.** Connect the BITS interface and facility alarm input wires, if applicable. |
| | **9.** Install the blank faceplates in the open slots. |
| | **10.** Ground the Cisco 6015 chassis, POTS splitter(s) (if applicable), and enclosure protection block. |
| | **11.** Connect the DC PEM to the fuse panel. |
| | **12.** Connect the DSL interface module to the POTS splitter(s) (applicable in a Cisco 6015 with a POTS splitter configuration). |
| | **13.** Connect the POTS splitter(s) to the enclosure protection block for the distribution frame or SAC box connections (applicable in a Cisco 6015 with a POTS splitter configuration). |
| | **14.** Connect the Cisco 6015 chassis to the enclosure protection block for the distribution frame or SAC box connections (applicable in a Cisco 6015 without a POTS splitter configuration). |
| | **15.** Connect the I/O[2] module on the subtending host chassis to the I/O module on the subtended node chassis (optional).<br>**Note** This step is necessary only when installing a subtended network configuration.<br>For an OC-3c/OC-3c NI-2 card subtended network configuration, the network connections are made through the faceplates of the OC-3c/OC-3c NI-2 cards, not the I/O modules. |
| | **16.** Connect the I/O module to the NIU[3] or to the enclosure protection block, as necessary.<br>**Note** If you have an OC-3c/OC-3c NI-2 card installed in your system, the network connection is made through the NI-2 card faceplate, not the I/O module. |
| | **17.** Apply power to the system. |
| | **18.** Verify that the fan modules are operational. |
| | **19.** Install the POTS cards (applicable in a Cisco 6015 with a POTS splitter configuration). |
| | **20.** Connect the Ethernet to the management network. |
| | **21.** Connect a console terminal. |
| | **22.** Connect the auxiliary port (optional). |
| | **23.** Complete initial configuration. |

1. BITS = building integrated timing supply
2. I/O = Input/Output
3. NIU = network interface unit

# 5.2 Installation Procedures

The following sections detail the installation procedures for a Cisco 6015 configuration (with or without a POTS splitter) in an outside-plant environment.

**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. Modules and 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.

## 5.2.1 Verify the Remote Terminal Enclosure Compliance

Verify with your third-party vendor that the remote terminal enclosure meets the following compliance requirements: GR-487, UL 50, Type 4X, EN60529 IP 55, and NEMA 4X.

## 5.2.2 Verify the Cooling Capacity

Verify the cooling capacity of the heat exchanger or air conditioner that is installed in the enclosure. The remote terminal enclosure must provide adequate cooling by using an appropriately sized heat exchanger or air conditioner to dissipate heat generated by the installed Cisco 6015 chassis and other remote terminal system components.

See Table 2-5 to determine the power dissapation for each component that is wired to the fuse panel. Once you have determined the power dissipation required for all of the components that will be installed in the remote terminal enclosure, verify that the capacity of the heat exchanger or air conditioner is greater than this value to ensure proper equipment operation.

Ensure that your cabinet has proper airflow. For information on ventilation, heat dissipation, and cooling, see the "Ventilation" section on page 2-13.

**Note** For information on the Cisco 6015, see the "Outside-Plant Operating Environment Requirements" section on page 2-12. For Cisco 6015 chassis measurements, see Table 2-3.

## 5.2.3 Verify and Measure Rack Space

Before you install any of the chassis, determine the total rack space that is required for the installation of your system. The required rack space depends on the type of line card installed and the number of Cisco 6015 chassis, POTS splitters, and additional outside-plant equipment that you plan to use. The number of components will increase if you plan to install a subtended network.

You can install a combination of the following Cisco 6015 components in a rack:

- Cisco 6015 chassis —In an outside-plant environment, Cisco recommends installing no more than three Cisco 6015 chassis in a four foot (1.22 meters) remote terminal enclosure.
- Third-party POTS splitter, applicable in a Cisco 6015 with a POTS splitter configuration.

**Note** A system configuration using 8xDMTs requires a POTS splitter that expands the system capacity to 48 subscriber ports. Depending on the POTS splitter selected for your configuration, the installation of an additional POTS splitter may be necessary.

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

**Tip** See the "Space" section on page 2-14 for the calculation table necessary to plan the total rack space for your Cisco 6015 system configuration. For Cisco 6015 chassis measurements, see Table 2-3.

## 5.2.4 Install the POTS Splitter

If you are installing a Cisco 6015 with a POTS splitter configuration, you can use third-party POTS splitters in a Cisco 6015 with a POTS splitter configuration. Please verify the compatibility with your Cisco representative. If you are installing a Cisco 6015 without a POTS splitter configuration, proceed to the "Install the Cisco 6015 Chassis" section on page 5-8.

**Note** In a system configuration using 8xDMTs, the system requires a POTS splitter that expands the system capacity to 48 subscriber ports. Depending on the POTS splitter selected for your configuration, the installation of an additional POTS splitter may be necessary.

For installation procedures for each POTS splitter, refer to the vendor documentation.

See Figure 1-2 for the correct placement of the POTS splitters.

## 5.2.5 Attach the BITS Interface Wire

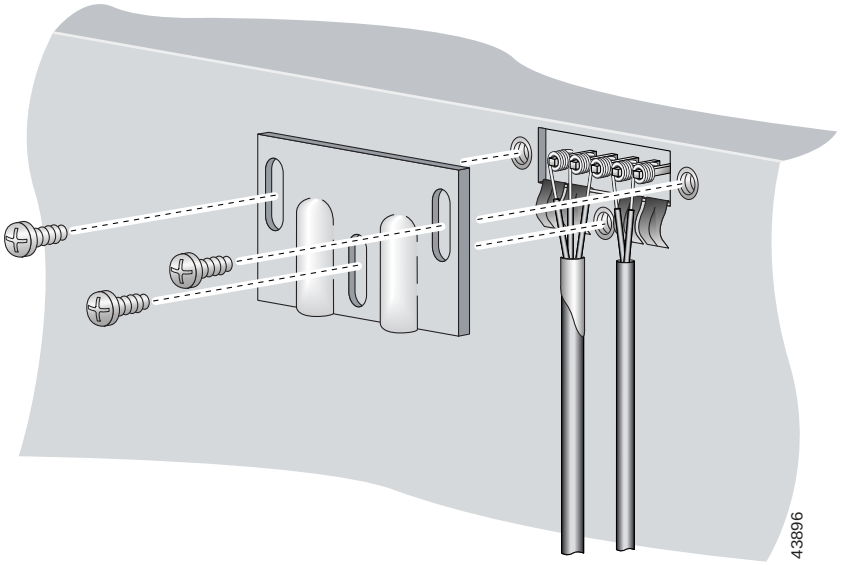
The BITS interface provides the network clocking. Complete the following steps to attach the BITS interface wire to the Cisco 6015 chassis:

**Note** For more information on the BITS interface, see the "Rear Interface Header" section on page 1-36.

**Step 1** Place the Cisco 6015 chassis on a flat and stable surface (for example, a table top).

**Step 2** Use a Phillips-head screwdriver to remove the three screws that hold the plate over the BITS interface pins, as shown in Figure 5-1. Remove the plate, and set the screws and the plate aside.

*Figure 5-1 Plate Removal over BITS Interface Pinouts*

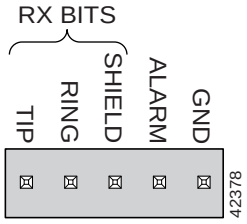



**Step 3** Measure one strand of wire long enough to connect the first three BITS interface pins to the BITS clock source. See Table 2-6 on page 2-19 for wire requirements.

**Note** Remember that it is important that the wires and cables do not block ventilation within the remote terminal enclosure. Verify that the wires and cables follow alongside the rack bars within the enclosure.

See Figure 5-2 for a close view of the pinouts that are located on the back of the Cisco 6015 chassis. For pinout descriptions, see Table 1-8 on page 1-37.

*Figure 5-2 BITS Interface Pinouts*




**Step 4** Use a wire stripper to remove the casing from both ends of the wire.

**Step 5** Pull the foil shield back over the wire casing and separate the three exposed wires, as shown in Figure 5-1.

**Step 6** Use a wire-wrapping tool to attach the drain wire in the twisted-pair to pin 3 (Shield), as shown in Figure 5-1.

**Step 7** Use a wire-wrapping tool to attach one of the two remaining wires in the twisted-pair to pin 2 (Ring), as shown in Figure 5-1.

**Step 8** Use a wire-wrapping tool to attach the remaining wire in the twisted-pair to pin 1 (Tip), as shown in Figure 5-1.

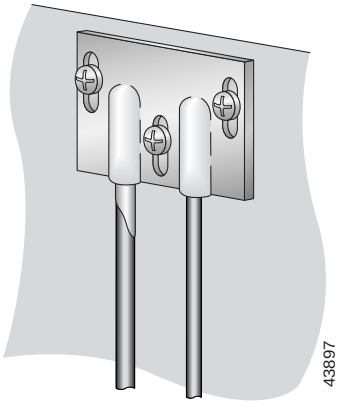
**Step 9** Use a Phillips-head screwdriver and three screws to reattach the plate that covers the BITS interface pins. Align the wires with the recessed channels on the plate so that the wires are not pinched when the plate is attached to the chassis, as shown in Figure 5-3.

**Note** When the plate is reattached to the chassis, the bottom of the plate should reside in the middle of the foil shield, as shown in Figure 5-3.

If you are going to connect the facility alarm input, do not reattach the plate at this time.

Do not connect the BITS interface wires to the BITS clock source at this time.

***Figure 5-3 Wire Alignment Under the Plate***




**Step 10** Repeat Step 2 through Step 9 for each Cisco 6015, as necessary.

## 5.2.6 Attach the Facility Alarm Input Wire

Complete the following steps to attach the facility alarm input wire to the Cisco 6015 chassis.

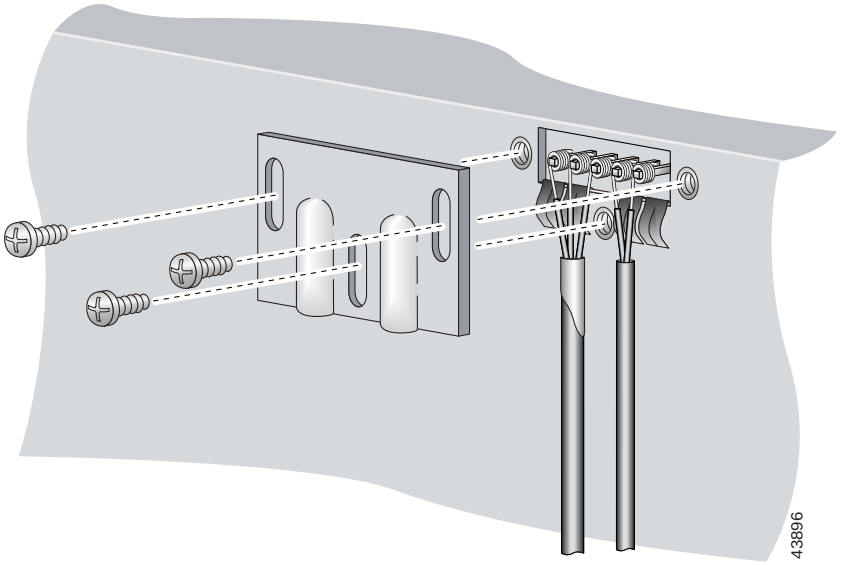
**Note** For more information on the facility alarm input, see the "Rear Interface Header" section on page 1-36.

**Step 1** Place the Cisco 6015 chassis on a flat and stable surface (for example, a table top).

**Step 2** Use a Phillips-head screwdriver to remove the three screws that hold the plate over the BITS interface pins, as shown in Figure 5-4. Remove the plate, and set the screws and the plate aside.

**Note** If you connected the BITS interface pins, skip this step and proceed to Step 3.

*Figure 5-4 Plate Removal Over Facility Alarm Input Pinouts*




**Step 3** Measure wire long enough to connect both pins 4 and 5 to the alarm relay contact. See Table 2-6 on page 2-19 for wire requirements.

**Note** It is important that the wires and cables do not block ventilation within the remote terminal enclosure. Verify that the wires and cables follow alongside the rack bars within the enclosure.

See Figure 5-2 for a close-up of the pinouts that are located on the back of the Cisco 6015 chassis. For pinout descriptions, see Table 1-8 on page 1-37.

**Step 4** Use a wire stripper to remove the casing from both ends of the wire.

**Step 5** Use a wire-wrapping tool to attach one of the wires to pin 4 (Alarm), as shown in Figure 5-4.

**Step 6** Use a wire-wrapping tool to attach the remaining wire to pin 5 (Ground), as shown in Figure 5-4.

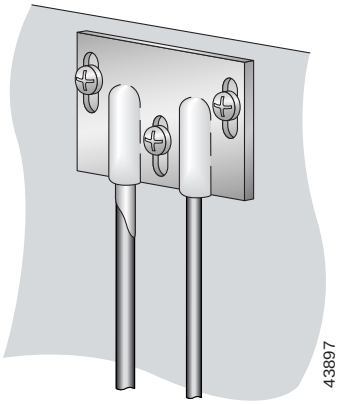
**Step 7** Use a Phillips-head screwdriver and three screws to reattach the plate that covers the BITS and alarm interface pins. Align the wires with the recessed channels on the plate so that the wires are not pinched when the plate is attached to the chassis, as shown in Figure 5-5.

**Note** When the plate is reattached to the chassis, the bottom of the plate should reside in the middle of the foil shield for the BITS interface. The casing for the facility alarm input wire should be captured under the plate. (See Figure 5-5.)

Do not connect the facility alarm input wires to the alarm event trigger at this time.

**Step 8** Repeat Step 2 through Step 7 for each Cisco 6015, as necessary.

*Figure 5-5 Wire Alignment Under the Plate*




## 5.2.7 Install the Cisco 6015 Chassis

Complete the following steps to install the Cisco 6015 chassis.

**Warning** **Two people are required to lift the chassis. Grasp the chassis underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back. To prevent damage to the chassis and components, never attempt to lift the chassis with the handles on the power supplies or on the interface modules. These handles were not designed to support the weight of the chassis.**

**Note** The Cisco 6015 chassis ships with the cards and modules installed. To prevent damage, ensure that the screws on each card and module are tightened so that the cards do not fall out of the chassis during installation.

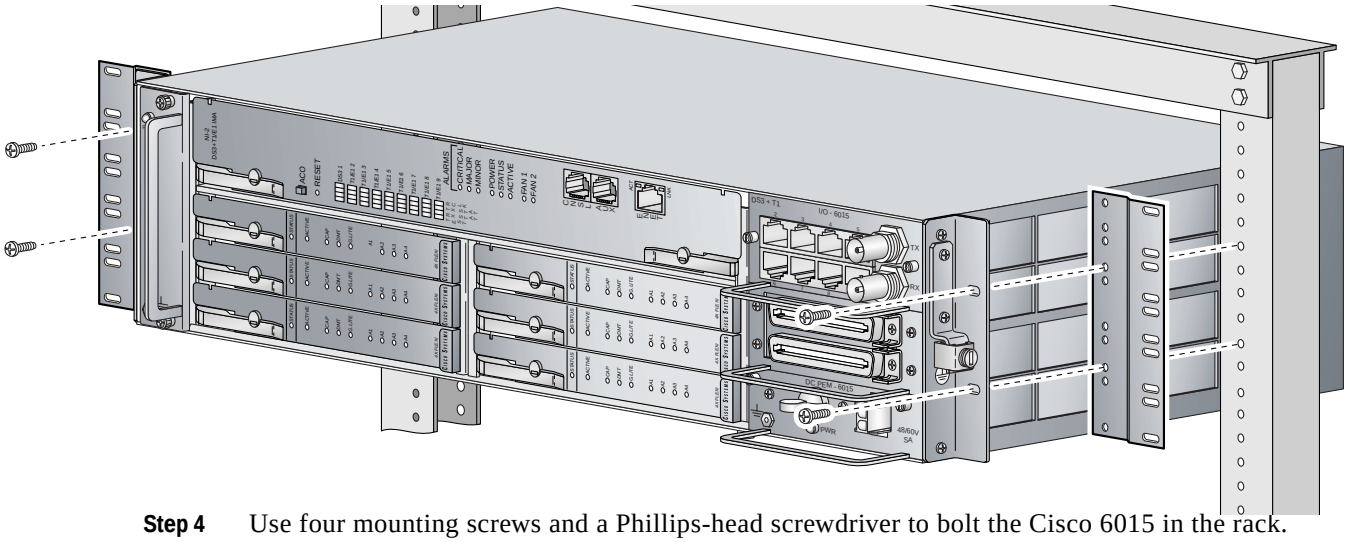
**Step 1** Connect a grounding strap to an ESD grounding jack on the Cisco 6015. See the "Preventing Electrostatic Discharge Damage" section on page 2-9 for ESD grounding jack locations on the Cisco 6015 system.

**Step 2** Position one Cisco 6015 above the POTS splitter (if applicable). The bottom of the Cisco 6015 chassis should be flush with the top of the POTS splitter.

**Caution** Be careful not to disconnect the wires coming from the back of the Cisco 6015 chassis for the BITS clock source and the alarm relay contact connections.

**Step 3** Use four mounting screws and a Phillips-head screwdriver to attach the extenders to the sides of the chassis if you are installing the system in a 23-inch rack, as shown in Figure 5-6.

*Figure 5-6 Extender Installation on the Cisco 6015*



**Step 4** Use four mounting screws and a Phillips-head screwdriver to bolt the Cisco 6015 in the rack.

**Step 5** Repeat Step 1 through Step 4 for each Cisco 6015, as necessary.

See Figure 1-2 for the correct placement of the Cisco 6015.

## 5.2.8 Connect the BITS Interface and Facility Alarm Input Wires

Complete the following steps to connect the BITS interface to the BITS clock source and the facility alarm input to the alarm relay contact:

**Step 1** Connect the other end of the wires from the "Attach the BITS Interface Wire" section on page 5-4 to the BITS clock source.

**Note** It is important that the wires and cables do not block ventilation within the remote terminal enclosure. Verify that the wires and cables follow alongside the rack bars within the enclosure.

**Step 2** Repeat Step 1 for each Cisco 6015, as necessary.

**Step 3** Connect the relay activator to the alarm event trigger using the wires connected to the Cisco 6015 chassis in the "Attach the Facility Alarm Input Wire" section on page 5-6.

**Step 4** Repeat Step 3 for each Cisco 6015, as necessary.

## 5.2.9 Install Blank Faceplates

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

**Warning** **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.**

Complete the following steps to install blank faceplates in any empty line card slots in the Cisco 6015:

**Step 1** Horizontally align the blank faceplate edge with the guides at the left and right of the slot.

**Step 2** Lift out on the ejector tab and gently apply pressure to the faceplate while pushing the blank faceplate into the slot.

**Step 3** Push on the faceplate to fully seat the blank faceplate.

**Step 4** Press down on the ejector tab to secure the faceplate.

## 5.2.10 Ground the Cisco 6015, POTS Splitter(s), and Enclosure Protection Block

During the system installation, complete the following steps to connect the grounding lug on the Cisco 6015, POTS splitter(s) (if applicable), and the enclosure protection block directly to the grounding bar in the enclosure.

**Warning** **When installing the unit, always make the ground connection first and disconnect it last.**

**Step 1** Measure enough wire to connect the Cisco 6015 to the enclosure grounding bar. See Table 2-6 on page 2-19 for wire requirements.

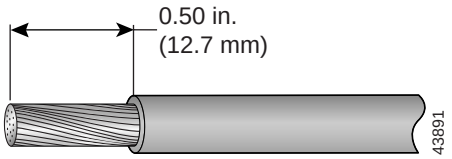
**Tip** Make sure that your wire is only as long as is needed to make the connection.

**Step 2** Cut the ends of the ground wire so that the ends are straight, not slanted.

**Step 3** Measure 1/2 inch (12.7 mm) up from the end of the ground wire and place a mark at that point. This is the wire end that will be connected to the Cisco 6015.

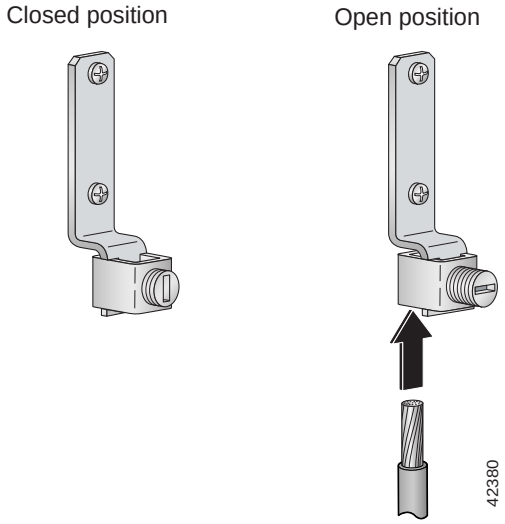
**Step 4** Use a wire stripper to remove 1/2 inch (12.7 mm) of the covering from the end of the wire. Trim the end of the covering so that it is straight, not slanted, as shown in Figure 5-7.

***Figure 5-7 Strip and Square Off Ground Wire***



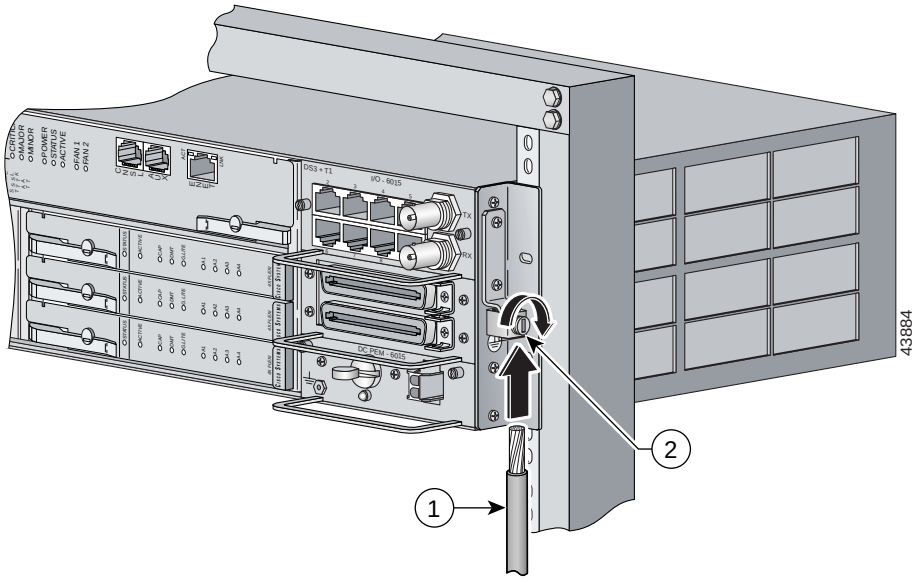

**Step 5** Use a flat-head screwdriver to loosen the compression screw (open position) that is provided on the grounding lug of the Cisco 6015, as shown in Figure 5-8.

*Figure 5-8 Grounding Lug Closed and Open Positions*




The Cisco 6015 grounding lug is located on the right side of the chassis (viewed from the front), as shown in Figure 5-9.

*Figure 5-9 Attaching the Grounding Wire to the Cisco 6015*




| | | | |
|---|---|---|---|
| **1** | Grounding wire | **2** | Grounding lug |

**Step 6** Insert the end of the copper wire that you prepared in Step 4 under the compression plate on the grounding lug, as shown in Figure 5-8.

**Caution** Do not place the copper wire between the compression screw and the compression plate.

**Step 7** Use a flat-head screwdriver to tighten the compression screw against the compression plate, as shown in Figure 5-8.

**Step 8** Prepare the other end of the wire to be connected to the enclosure grounding bar, according to the requirements of your site.

**Step 9** Use a flat-head screwdriver to loosen the screw on the enclosure grounding bar.

**Step 10** Connect the copper wire to a ring lug (large enough for the screw to fit through).

**Step 11** Use a flat-head screwdriver and the screw that you loosened in Step 9 to attach the ring lug to the enclosure grounding bar.

**Step 12** Use a flat-head screwdriver to tighten the screw over the copper wire.

**Step 13** Repeat Step 1 through Step 12 for each Cisco 6015, as necessary.

**Step 14** Ground each POTS splitter to the enclosure grounding bar.

**Note** For wire specifications and procedures for grounding each POTS splitter, refer to the vendor documentation.

**Step 15** Ground the enclosure protection block to the enclosure grounding bar.

**Note** For wire specifications and procedures for grounding the enclosure protection block, refer to the vendor documentation.

Do not ground the components in a rack by chaining them together.

## 5.2.11 Connect the DC PEM to the Fuse Panel

**Caution** To prevent the system from powering up, do not install the fuses at this time. If the fuses are already installed in the fuse panel, remove them. You can replace the fuses after the system is installed and connected.

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

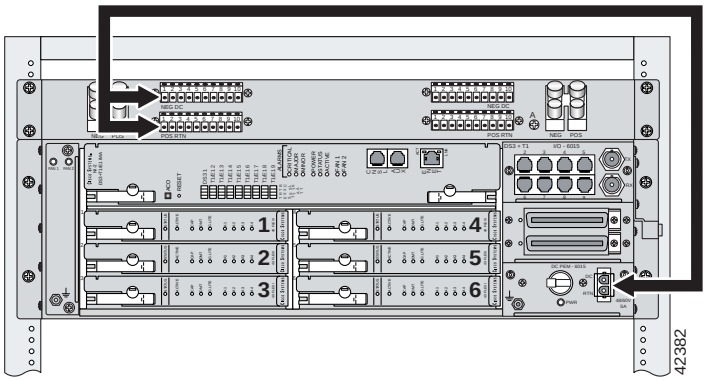
Complete the following steps to connect the DC PEM to the fuse panel:

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

See Chapter 2, "Preparing for Installation," for the calculation tables that are necessary to determine the typical power requirement for each component that is wired to the fuse and alarm panel.

**Step 1** Attach one end of the DC power cable (part number 72-2223-01) to the 2-pin connector located on the faceplate of the DC PEM, as shown in Figure 5-10.

***Figure 5-10 Connecting the DC PEM to the Fuse and Alarm Panel***




**Step 2** Attach the red wire coming from the DC PEM to a fuse and alarm panel POS (positive) DC connector, as shown in Figure 5-10.

**Step 3** Attach the black wire coming from the DC PEM to a fuse and alarm panel NEG (negative) DC connector, as shown in Figure 5-10.

**Step 4** Repeat Step 1 through Step 3 for each Cisco 6015, as necessary.

**Caution** Do not set the circuit breaker on the DC PEM to the ON (1) position at this time.

## 5.2.12 Connect the DSL Interface Module to the POTS Splitter(s)

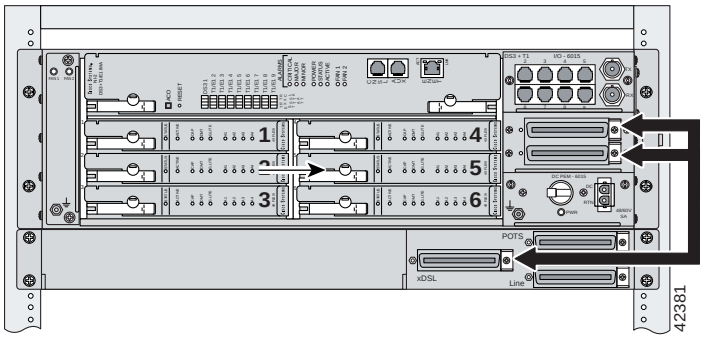
If you are installing a Cisco 6015 with a POTS splitter configuration, please verify the POTS splitter compatibility with your Cisco representative. If you are installing a Cisco 6015 without a POTS splitter configuration, proceed to the "Connect the Cisco 6015 to the Enclosure Protection Block or SAC Box" section on page 5-15.

**Note** See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class A or EN55022 Class A compliance, the cables will need to be looped through ferrites.

For cabling procedures for each POTS splitter, refer to the vendor documentation.

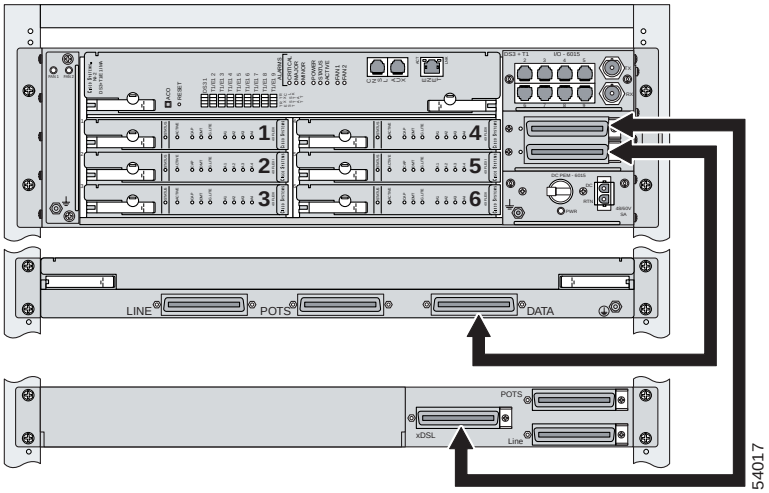
Figure 5-11 and Figure 5-12 show examples of cabling between the DSL interface module and third-party POTS splitters. These connections are for *x*DSL data flow between the Cisco 6015 and the third-party POTS splitters.

*Figure 5-11 Connecting the DSL Interface Module to the Corning Cable Systems POTS Splitter*



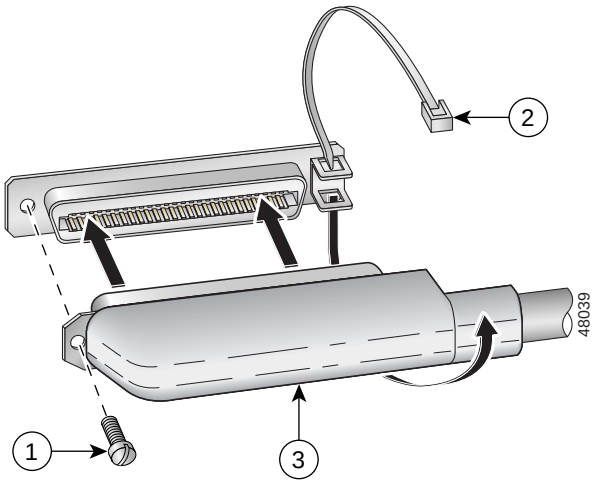

In a system configuration using 8xDMTs, the system requires a POTS splitter that expands the system capacity to 48 subscriber ports. Depending on the POTS splitter selected for your configuration, the installation of an additional POTS splitter may be necessary. Figure 5-12 shows the cabling between the DSL interface module and two third-party POTS splitters. These connections are for *x*DSL data flow between the Cisco 6015 and the POTS splitters.

*Figure 5-12 Connecting the DSL Interface Module to Two POTS Splitters*



Ensure that all cables are screwed in and that the Champ connectors are tie wrapped. (See Figure 5-13.)

***Figure 5-13 Attaching a Champ Connector to the Chassis***




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

## 5.2.13 Connect the POTS Splitter(s) to the Enclosure Protection Block or SAC Box

You can use different third-party POTS splitters in a Cisco 6015 with a POTS splitter configuration. Please verify the compatibility of your third-party POTS splitter with your Cisco representative.

For cabling procedures for each POTS splitter, refer to the appropriate vendor documentation.

**Note** See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class A or EN55022 Class A compliance, the cables will need to be looped through ferrites.

## 5.2.14 Connect the Cisco 6015 to the Enclosure Protection Block or SAC Box

If you are installing a Cisco 6015 without a POTS splitter configuration, connect the two Champ cables from the DSL interface module (DSL Slots 1 through 3 and DSL Slots 4 through 6) to the enclosure protection block or SAC box connections. If you are installing a Cisco 6015 with a POTS splitter configuration, proceed to the "Connect the I/O Modules for Subtending" section on page 5-16.

Ensure that all cables are screwed in to the backplane and that the Champ connectors are tie wrapped. (See Figure 5-13.)

**Note** See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class A or EN55022 Class A compliance, the cables will need to be looped through ferrites.

# 5.2.15 Connect the I/O Modules for Subtending

If you are installing a subtended network, complete the following steps. If you are not installing a subtended network, proceed to the "Connect the I/O Module to the NIU or Enclosure Protection Block" section on page 5-17.

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

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

**Note** For more information on a subtended network configuration, see the "Subtended Network Configuration" section on page 1-6.

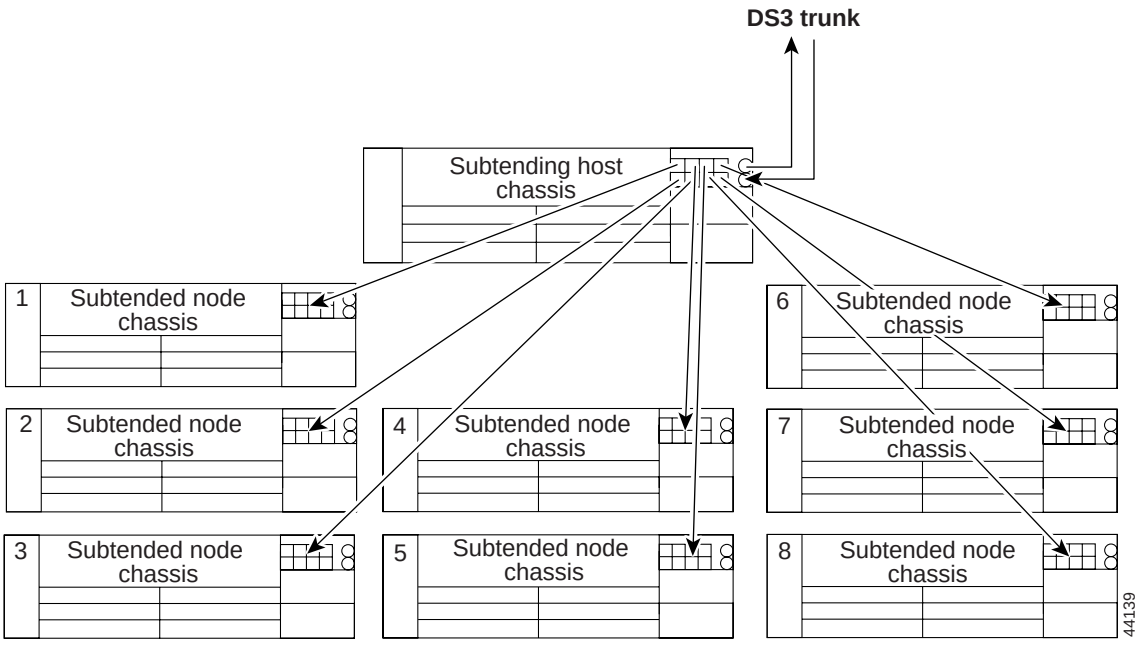
See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

**Step 1** 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.

**Step 2** Connect the other end of the RJ-48 cable to one of the RJ-48 receptacles on the I/O module in a subtended node chassis.

Figure 5-14 shows an example of a subtended network configuration.

***Figure 5-14 Subtended Network Configuration***



**Step 3** Repeat Step 1 through Step 2 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 RJ-48 receptacles on the I/O module. Therefore, you can subtend only seven chassis from the I/O module.

## 5.2.16 Connect the I/O Module to the NIU or Enclosure Protection Block

The following sections detail the I/O module connection procedures for a DS3, T1, E1, or IMA group connection.

### 5.2.16.1 DS3 Network Connection Installation

Complete the following steps to connect the I/O module to the network using a DS3 connection. If you are using a T1 connection, proceed to the "T1 Network Connection Installation" section on page 5-18. If you are using an E1 connection, proceed to the "E1 Network Connection Installation" section on page 5-18.If you are using an IMA connection, proceed to the "IMA Network Connection Installation" section on page 5-19.

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

**Step 1** Verify that you have a DS3+T1 I/O module installed in the Cisco 6015 chassis.

**Step 2** The I/O module DS3 connections attach to the ATM switch, through the NIU. 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.

**Note** See Table 2-6 on page 2-19 for cable requirements.

**Step 3** Attach the other end of the cable that originates at the TX DS3 BNC connector to the RX DS3 BNC connector on the NIU.

**Step 4** Attach one end of a coaxial cable (type 734A or equivalent) to the RX DS3 BNC connector on the I/O module.

**Step 5** Attach the other end of the cable that originates at the RX DS3 BNC connector to the TX DS3 BNC connector on the NIU.

**Step 6** Connect the NIU to the ATM network according to the NIU manufacturer specifications.

**Step 7** Repeat Step 1 through Step 6 for each Cisco 6015, as necessary.

### 5.2.16.2 T1 Network Connection Installation

Complete the following steps to connect the I/O module to the network using a T1 connection. If you are using an E1 connection, proceed to the "E1 Network Connection Installation" section on page 5-18. If you are using an IMA connection, proceed to the "IMA Network Connection Installation" section on page 5-19.

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

**Step 1** Verify that you have a DS3+T1 I/O module installed in the Cisco 6015 chassis.

**Step 2** 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** See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

**Step 3** Connect the other end of the cable used in Step 2 to the NIU or enclosure protection block.

**Step 4** Connect the NIU or enclosure protection block to the ATM network according to the NIU or remote terminal enclosure manufacturer specifications.

**Step 5** Repeat Step 1 through Step 4 for each Cisco 6015, as necessary.

**Note** Verify that the RJ-48 cable pinouts connect TX to RX and RX to TX.

### 5.2.16.3 E1 Network Connection Installation

Complete the following steps to connect the I/O module to the network using an E1 connection. If you are using an IMA connection, proceed to the "IMA Network Connection Installation" section on page 5-19.

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

**Step 1** Verify that you have an E1 I/O module installed in the Cisco 6015 chassis.

**Step 2** 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** See Table 2-6 on page 2-19 for cable and ferrite requirements. If unshielded cable is used for FCC Class B or EN55022 Class B compliance, the cables will need to be looped through ferrites.

**Step 3** Connect the other end of the cable used in Step 2 to the NIU or enclosure protection block.

**Step 4** Connect the NIU or enclosure protection block to the ATM network according to the NIU or remote terminal enclosure manufacturer specifications.

**Step 5** Repeat Step 1 through Step 4 for each Cisco 6015, as necessary.

**Note** Verify that the RJ-48 cable pinouts connect TX to RX and RX to TX.

### 5.2.16.4 IMA Network Connection Installation

See the "IMA Configuration" section on page 1-8 for more information on how to configure an IMA network connection.

## 5.2.17 Apply Power

Complete the following steps to apply DC power to the Cisco 6015 system.

**Warning** **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.**

**Step 1** Apply power to the system with one of the following methods:

- Install the fuses in the fuse panel.
- Reinsert the fuses in the fuse panel if you removed them in the "Connect the DC PEM to the Fuse Panel" section on page 5-12.
- Turn on the breakers in the fuse panel.

**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 2** Verify that the DC PEM is properly connected to the fuse panel as described in the "Connect the DC PEM to the Fuse Panel" section on page 5-12.

**Step 3** Set the circuit breaker on the DC PEM to the ON (1) position.

**Step 4** 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 Chapter 6, "Troubleshooting" for troubleshooting procedures.

**Step 5** Check the polarity of the –48V DC connections to each chassis by attaching a voltmeter with the minus lead on the red wire and the plus lead on the black wire, at the fuse panel. Ensure that the meter reads between –40V DC and –68V DC. If your voltmeter shows a positive voltage, the power inputs might be reversed. If the voltmeter shows a negative voltage that is out of the –40V DC to –68V DC range, check the power supply for failure or check for a blown fuse in the fuse panel.

## 5.2.18 Verify Fan Module Operation

Verify that the fan module is operational by locating the LEDs on the front of the fan module. If the LEDs are

- Green—The fan module is operational.
- Red—The fan module is not operational and the fan module is in alarm mode. See Chapter 6, "Troubleshooting" for troubleshooting procedures.
- Off—The fan is not operational due to a power problem or the LED is defective. See Chapter 6, "Troubleshooting" for troubleshooting procedures.

The fans should be operational before you complete the installation procedures.

**Caution** It is important that the Cisco 6015 cooling fans run continuously.

## 5.2.19 Install the POTS Cards

If you are installing a Cisco 6015 with a POTS splitter configuration, install the POTS cards. For POTS card installation procedures for each third-party POTS splitter, refer to the vendor documentation.

If you are installing a Cisco 6015 without a POTS splitter configuration, proceed to the "Connect the Ethernet to the Management Network" section on page 5-20.

## 5.2.20 Connect the Ethernet to the Management Network

Complete the following steps to connect the Ethernet to the management network.

**Warning** **The ports labeled "Ethernet," "10BaseT," "Token Ring," "Console," and "AUX" are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the BRI circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage (TNV) circuits.**

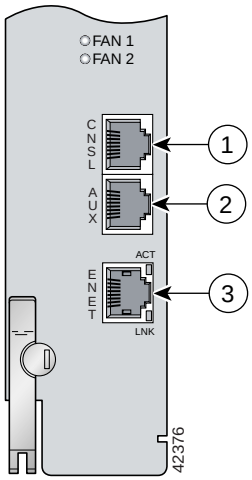
**Tip** Cisco recommends that you label each data cable at both ends to identify its destination.

**Step 1** Verify that you have an ITEMP DS3+T1/E1 IMA NI-2 card installed in the Cisco 6015 chassis.

**Step 2** Connect the 10BaseT RJ-45 connector to the ITEMP DS3+T1/E1 IMA NI-2 card (ENET). Figure 5-15 shows where to connect the Ethernet cable.

**Note** See Table 2-6 on page 2-19 for cable and ferrite requirements.

*Figure 5-15 ENET, CNSL, and AUX RJ-45 Receptacles on the ITEMP DS3+T1/E1 IMA NI-2 Card*




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

**Step 3** Run the cable through the ferrite one time, loop the cable back through the ferrite, and clamp the ferrite shut.

**Step 4** Connect the other end of the cable to the management network (for example, a LAN).

## 5.2.21 Connect a Console Terminal

Connect a VT100-compatible terminal to the system console port on the ITEMP DS3+T1/E1 IMA NI-2 card (CNSL) for field service. Connect the terminal to a power source and set it up using the values that are shown in Table 5-2. Figure 5-15 shows where to connect the console cable. See Table 2-6 on page 2-19 for cable requirements.

**Warning** **The ports labeled "Ethernet," "10BaseT," "Token Ring," "Console," and "AUX" are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the BRI circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage (TNV) circuits.**

*Table 5-2 Terminal Settings*

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

## 5.2.22 Connect the Auxiliary Port

Connect a terminal, a modem, or another serial device to the auxiliary port on the ITEMP DS3+T1/E1 IMA NI-2 card (AUX). Figure 5-15 shows where to connect the auxiliary cable. See Table 2-6 on page 2-19 for cable requirements.

**Warning** **The ports labeled "Ethernet," "10BaseT," "Token Ring," "Console," and "AUX" are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the BRI circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage (TNV) circuits.**

**Note** This step is optional.

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

## 5.2.23 Complete Initial Configuration

When you turn on the Cisco 6015 for the first time, an interactive dialog called the System Configuration Dialog appears on the console screen. The System Configuration Dialog guides you through the initial configuration process. (You can run the dialog at any time by entering the **setup** command in privileged EXEC mode.)

When you complete the dialog, the system displays the configuration command script that you have created. It then offers you three options:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
```

If you enter **2**, the configuration is saved and used. If you answer **0** or **1,** the configuration you created is not saved. Enter **1** if you wish to discard the configuration and restart the System Configuration Dialog.

After you have saved the initial configuration, you must set the temperature rating for your system using the **set temp** command.

To set the system temperature rating to **osp** (outside-plant environment):

```
DSLAM> set temperature-rating osp
```

To set the system temperature rating to **commercial**:

```
DSLAM# set temperature-rating commercial
```

A **temperature rating mismatch** alarm is triggered when a commercial or outside-plant environment line card or network interface card is installed in a systemthat has been configured with a different temperature rating. Therefore, if a system is configured for an outside-plant environment, and a commercial line card or network interface card is installed in the system, the **temperature rating mismatch** alarm will be triggered. Similarly, if a system is configured for a commercial environment, and an outside-plant environment line card or network interface card is installed in the system, the **temperature rating mismatch** alarm will be triggered.

**Note** Use the **show facility-alarm status** command to display any current alarms on the system.

The following is sample output of the **show facility-alarm status** command for the Cisco 6015:

```
System Totals  Critical: 1  Major: 0  Minor: 0
Source: ATM0/1          Severity: CRITICAL Description: 0    Loss of Signal
```

## 5.2.23.1 Before You Begin

Complete these steps before you run the System Configuration Dialog:

**Step 1** Determine the IP address for the Ethernet interface.

**Step 2** If you plan to configure in-band management, also determine the IP address for the ATM interface that will be used for in-band management (ATM0/0).

**Step 3** Find out what the password strategy is for your environment. The System Configuration Dialog prompts you for three passwords, plus an SNMP community string. The three required password types are enable secret, enable, and virtual terminal.

**Step 4** Choose a name for the Cisco 6015. (This step is optional.)

## 5.2.23.2 Using the System Configuration Dialog

When you power up a Cisco 6015 for the first time, you are offered the option of running the System Configuration Dialog. The System Configuration Dialog offers two configuration options: basic management setup and extended setup.

- Choose basic management setup if you want to use the System Configuration Dialog to configure the passwords and the Ethernet interface only, and then use the management station or the command line interface to configure the remaining Cisco 6015 interfaces.
- Choose extended setup if you want to use the System Configuration Dialog to configure all of the Cisco 6015 interfaces.

An example of the use of each option follows the "Interface Numbering" section.

### 5.2.23.2.1 Interface Numbering

The System Configuration Dialog and the command line interface use the following interface numbering scheme:

- Interfaces whose names begin with "ATM0" (ATM0/0, ATM0/1, and so forth) are NI-2 card WAN interfaces. ATM0/0 is the ATM switch interface with the processor (sometimes referred to as the ASP interface, for ATM switch/processor). There is no need to configure ATM0/0 unless you plan to use in-band management. For DS3+T1, ATM0/1 is the default trunk port. ATM0/2 and through ATM0/9 are subtending interfaces. For E1, ATM0/2 is the default trunk port.For IMA group interfaces using the ITEMP DS3+T1/E1 IMA NI-2 card, one port from ATM0/ima0 through ATM0/ima3 can be the trunk port, with the other three being possible subtending interfaces.

- Interfaces whose names begin with “ATM1” through “ATM6” are line card interfaces.
- Ethernet0/0 is the interface for the LAN that connects the Cisco 6015 to its management system.

For line card interfaces, the number before the slash indicates the slot number. The number after the slash indicates the interface or port number. For example, ATM6/4 is slot 6, port 4.

#### 5.2.23.2.2 Basic Management Setup Example

This is the basic management setup example:

```
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: y

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: y
Configuring global parameters:

  Enter host name [DSLAM]: 6015_basic

  The enable secret is a password used to protect access to
  privileged EXEC and configuration modes. This password, after
  entered, becomes encrypted in the configuration.
  Enter enable secret: cisco

  The enable password is used when you do not specify an
  enable secret password, with some older software versions, and
  some boot images.
  Enter enable password: lab

  The virtual terminal password is used to protect
  access to the router over a network interface.
  Enter virtual terminal password: lab
  Configure SNMP Network Management? [yes]: y
    Community string [public]:

Current interface summary

Any interface listed with OK? value "NO" does not have a valid configuration

Interface                  IP-Address      OK? Method Status                Protocol
ATM0/0                     unassigned      NO  unset  up                    up
Ethernet0/0                unassigned      NO  unset  up                    up
ATM0/1                     unassigned      NO  unset  up                    down
ATM0/2                     unassigned      NO  unset  down                  down
ATM0/3                     unassigned      NO  unset  down                  down
ATM0/4                     unassigned      NO  unset  down                  down
ATM0/5                     unassigned      NO  unset  down                  down
ATM0/6                     unassigned      NO  unset  down                  down
ATM0/7                     unassigned      NO  unset  down                  down
ATM0/8                     unassigned      NO  unset  down                  down
ATM0/9                     unassigned      NO  unset  down                  down
ATM0/IMA0                  unassigned      NO  unset  up                    up
ATM0/IMA1                  unassigned      NO  unset  up                    up
ATM0/IMA2                  unassigned      NO  unset  up                    up
ATM0/IMA3                  unassigned      NO  unset  up                    up
```

```
Enter interface name used to connect to the
management network from the above interface summary: ethernet0/0

Configuring interface Ethernet0/0:
  Configure IP on this interface? [yes]:
    IP address for this interface: 192.168.1.1
    Subnet mask for this interface [255.255.255.0] : 255.255.255.0
    Class C network is 192.168.1.0, 24 subnet bits; mask is /24

The following configuration command script was created:

hostname 6015_basic
enable secret 5 $1$f1TA$jw/Rpe/EBj.fDQ3HYCjVw/
enable password lab
line vty 0 4
password lab
snmp-server community public
!
no ip routing

!
interface ATM0/0
shutdown
no ip address
!
interface Ethernet0/0
no shutdown
ip address 192.168.1.1 255.255.255.0
!
interface ATM0/1
shutdown
no ip address
!
interface ATM0/2
shutdown
no ip address
!
interface ATM0/3
shutdown
no ip address
!
interface ATM0/4
shutdown
no ip address
!
interface ATM0/5
shutdown
no ip address
!
interface ATM0/6
shutdown
no ip address
!
interface ATM0/7
shutdown
no ip address
!
interface ATM0/8
shutdown
no ip address
!
interface ATM0/9
```

```
shutdown
no ip address
!
interface ATM0/IMA0
shutdown
no ip address
!
interface ATM0/IMA1
shutdown
no ip address
!
interface ATM0/IMA2
shutdown
no ip address
!
interface ATM0/IMA3
shutdown
no ip address
!
end


[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
% Shutdown not allowed for ATM0/0.
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.


Press RETURN to get started!
```

#### 5.2.23.2.3 Extended Setup Example

This is the extended setup example:

```
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: y

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: n

First, would you like to see the current interface summary? [yes]:

Any interface listed with OK? value "NO" does not have a valid configuration

Interface                  IP-Address      OK? Method Status                Protocol
ATM0/0                     unassigned      NO  unset  up                    up
Ethernet0/0                unassigned      NO  unset  up                    up
ATM0/1                     unassigned      NO  unset  up                    down
ATM0/2                     unassigned      NO  unset  down                  down
ATM0/3                     unassigned      NO  unset  down                  down
```

```
ATM0/4                  unassigned      NO  unset  down                  down
ATM0/5                  unassigned      NO  unset  down                  down
ATM0/6                  unassigned      NO  unset  down                  down
ATM0/7                  unassigned      NO  unset  down                  down
ATM0/8                  unassigned      NO  unset  down                  down
ATM0/9                  unassigned      NO  unset  down                  down
ATM0/IMA0               unassigned      NO  unset  up                    up
ATM0/IMA1               unassigned      NO  unset  up                    up
ATM0/IMA2               unassigned      NO  unset  up                    up
ATM0/IMA3               unassigned      NO  unset  up                    up


Configuring global parameters:

  Enter host name [DSLAM]: 6015

  The enable secret is a password used to protect access to
  privileged EXEC and configuration modes. This password, after
  entered, becomes encrypted in the configuration.
  Enter enable secret: cisco

  The enable password is used when you do not specify an
  enable secret password, with some older software versions, and
  some boot images.
  Enter enable password: test

  The virtual terminal password is used to protect
  access to the router over a network interface.
  Enter virtual terminal password: test
  Configure SNMP Network Management? [yes]:
    Community string [public]:
  Configure IP? [yes]:
    Configure IGRP routing? [yes]: n
    Configure RIP routing? [no]:
  Configure CLNS? [no]:
  Configure bridging? [no]:

Configuring interface parameters:

Do you want to configure ATM0/0  interface? [yes]: n

Do you want to configure Ethernet0/0  interface? [yes]:
  Configure IP on this interface? [yes]:
    IP address for this interface: 192.168.1.1
    Subnet mask for this interface [255.255.255.0] :
    Class C network is 192.168.1.0, 24 subnet bits; mask is /24

Do you want to configure ATM0/1  interface? [yes]:
  Configure IP on this interface? [yes]: n

Do you want to configure ATM0/2  interface? [yes]:
  Configure IP on this interface? [yes]: n

Do you want to configure ATM0/3  interface? [yes]: n

Do you want to configure ATM0/4  interface? [yes]: n

Do you want to configure ATM0/5  interface? [yes]: n

Do you want to configure ATM0/6  interface? [yes]: n

Do you want to configure ATM0/7  interface? [yes]: n

Do you want to configure ATM0/8  interface? [yes]: n
```

```
Do you want to configure ATM0/9  interface? [yes]: n

Do you want to configure ATM0/IMA0  interface? [yes]: n

Do you want to configure ATM0/IMA1  interface? [yes]: n

Do you want to configure ATM0/IMA2  interface? [yes]: n

Do you want to configure ATM0/IMA3  interface? [yes]: y
  Configure IP on this interface? [yes]:
    IP address for this interface: 192.168.2.1
    Subnet mask for this interface [255.255.255.0] :
    Class C network is 192.168.2.0, 24 subnet bits; mask is /24

The following configuration command script was created:

hostname 6015
enable secret 5 $1$T768$ufaioPuEf1cGFCG0VtmUV1
enable password test
line vty 0 4
password test
snmp-server community public
!
ip routing
no clns routing
no bridge 1
!
interface ATM0/0
shutdown
no ip address
!
interface Ethernet0/0
ip address 192.168.1.1 255.255.255.0
!
interface ATM0/1
no ip address
!
interface ATM0/2
no ip address
!
interface ATM0/3
shutdown
no ip address
!
interface ATM0/4
shutdown
no ip address
!
interface ATM0/5
shutdown
no ip address
!
interface ATM0/6
shutdown
no ip address
!
interface ATM0/7
shutdown
no ip address
!
interface ATM0/8
shutdown
no ip address
```

```
!
interface ATM0/9
shutdown
no ip address
!
interface ATM0/IMA0
shutdown
no ip address
!
interface ATM0/IMA1
shutdown
no ip address
!
interface ATM0/IMA2
shutdown
no ip address
!
interface ATM0/IMA3
ip address 192.168.2.1 255.255.255.0
dialer-list 1 protocol ip permit
dialer-list 1 protocol ipx permit
!
end


[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
% Shutdown not allowed for ATM0/0.
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.


Press RETURN to get started!
```

**Note** To configure your system, refer to the appropriate software or network management configuration guides.