



Cisco 6160 DS3/2DS3+8xT1 IMA I/O Card FRU Installation and Replacement Notes

Product Number: 6160-1-I/O-2=

This document provides an overview of and installation and replacement procedures for the Cisco 6160 DS3/2DS3+8xT1 inverse multiplexing over ATM (IMA) input/output (I/O) card on the Cisco 6160. The I/O card is a field-replaceable unit (FRU) for the Cisco 6160 chassis.



Warning

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

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Introduction

A DS3/2DS3+8xT1 IMA I/O card

- Provides the following trunk and subtending interfaces:
 - Up to three DS3.
 - Up to eight T1.
 - Up to eight T1 IMA group.



Note For more information on IMA group interfaces, refer to the *T1/E1 Inverse Multiplexing Over ATM* feature module.

- Provides, when used with the OC-3c/OC-3c NI-2 card, one network OC-3c WAN trunk interface and one OC-3c subtend interface through connectors located on the NI-2 card faceplate.
- Provides five rows of six wire-wrap pins located on the right side of the DS3/2DS3+8xT1 IMA I/O card that support central office alarm relay interfaces (visual and audible) between the NI-2 card and the subscriber and building integrated timing source (BITS) clock input circuits.
- Supports up to 12 additional subtended node chassis, configured for DS3, T1, or T1 IMA operation.

Figure 1 shows a close-up of the DS3/2DS3+8xT1 IMA I/O card with the EMI cover installed.

Figure 1 DS3/2DS3+8xT1 IMA I/O Card with the EMI Cover

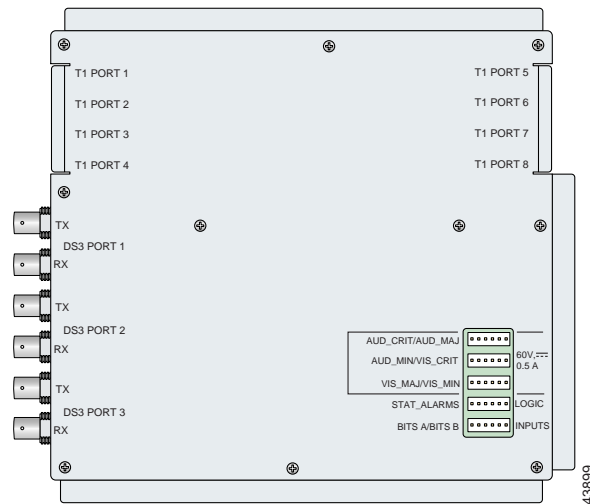
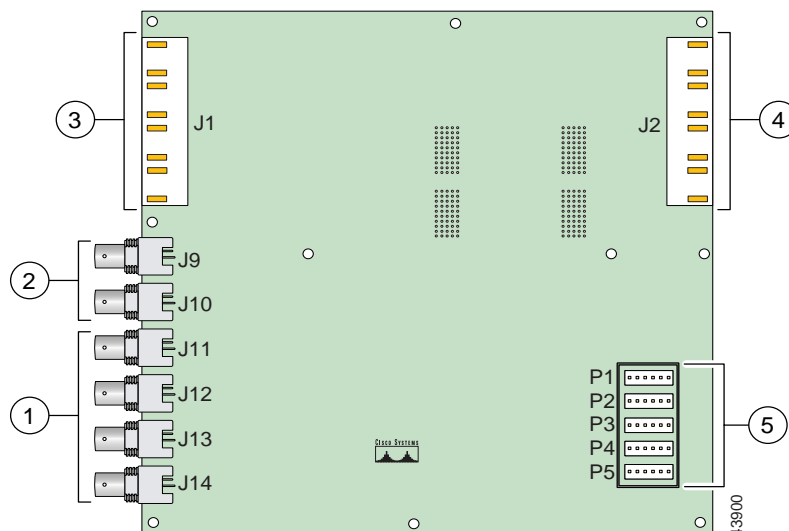


Figure 2 shows a close-up of the DS3/2DS3+8xT1 IMA I/O card without the EMI cover installed.

Figure 2 DS3/2DS3+8xT1 IMA I/O Card Without the EMI Cover



1	DS3 downstream subtend interface connectors (Port 2 and Port 3)	4	Four RJ-48c receptacles for T1 interfaces (T1 Port 5 through Port 8)
2	DS3 trunk interface or upstream subtend interface connectors (Port 1)	5	Wire wrap connectors that support central office alarm relay interfaces and BITS clock input circuits
3	Four RJ-48c receptacles for T1 interfaces (T1 Port 1 through Port 4)		

The DS3/2DS3+8xT1 IMA I/O card provides three sets of two vertically paired DS3 75-ohm Bayonet-Neill-Concelman (BNC) coaxial cable connectors that are located on the left side of the DS3/2DS3+8xT1 IMA I/O card. Each set of port connectors has both a transmit (TX) connector and a receive (RX) connector. Table 1 lists the DS3 BNC connector sets in relation to the NI-2 cards available for the Cisco 6160 chassis.

Table 1 DS3/2DS3+8xT1 IMA I/O Card BNC Connector Set Functions with the NI-2 Cards

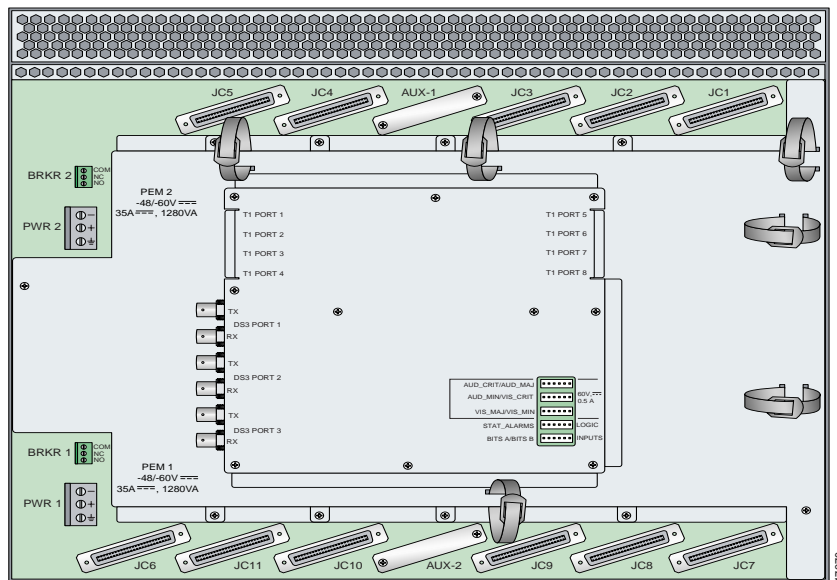
NI-2 Card	Chassis configuration	DS3 BNC Connector Sets		
		Port 1	Port 2	Port 3
DS3/2DS3	Subtending host chassis	Trunk interface.	Downstream subtend interface.	
	Subtended node chassis	Upstream subtend interface.	Downstream subtend interface.	

Table 1 DS3/2DS3+8xT1 IMA I/O Card BNC Connector Set Functions with the NI-2 Cards (continued)

NI-2 Card	Chassis configuration	DS3 BNC Connector Sets		
		Port 1	Port 2	Port 3
DS3+T1/E1 IMA	Subtending host chassis	DS3 Trunk interface (optional). You can also use any T1 receptacle connector for the T1 or T1 IMA trunk interface.	Not in use. Use the T1 receptacle connectors for T1 or T1 IMA subtend interfaces.	
	Subtended node chassis	Not in use. Use the T1 receptacle connectors for T1 or T1 IMA subtend interfaces.		
OC-3c/2DS3	Subtending host chassis	Not in use.	Downstream subtend interface.	
	Subtended node chassis	Upstream subtend interface.	Downstream subtend interface.	
OC-3c/OC-3c	Subtending host chassis	Not in use. The trunk and subtend interfaces are located on the NI-2 card.		
	Subtended node chassis	Not in use. The trunk and subtend interfaces are located on the NI-2 card.		

The DS3/2DS3+8xT1 IMA I/O card is delivered installed and attached to the two 2-mm hard metric (HM) card connectors, P3 and P9, on the chassis backplane (see Figure 3). The DS3/2DS3+8xT1 IMA I/O card is shown with the metal EMI cover installed.

Figure 3 DS3/2DS3+8xT1 IMA I/O Card Location on the Cisco 6160 Chassis Backplane



Pinouts for the RJ-48c Receptacles

The RJ-48c receptacles are used for a T1 or T1 IMA configuration. [Table 2](#) shows the pin assignments for the receptacles.

Table 2 *Pin Assignments for the RJ-48c Receptacles*

Pin	Description
1	Receive ring
2	Receive tip
3	No connection
4	Transmit ring
5	Transmit tip
6	No connection
7	No connection
8	No connection

Wire-Wrap Pins

There are 30 wire-wrap pins located on the right side of each DS3/2DS3+8xT1 IMA I/O card that support

- Central office alarm relay interfaces (visual and audible) between the NI-2 card and the subscriber.
- BITS clock input circuits.
- Wire wrap and socket type connections. A six-pin connector, Molex 26-03-3061, can be used to mate with each of the five headers.



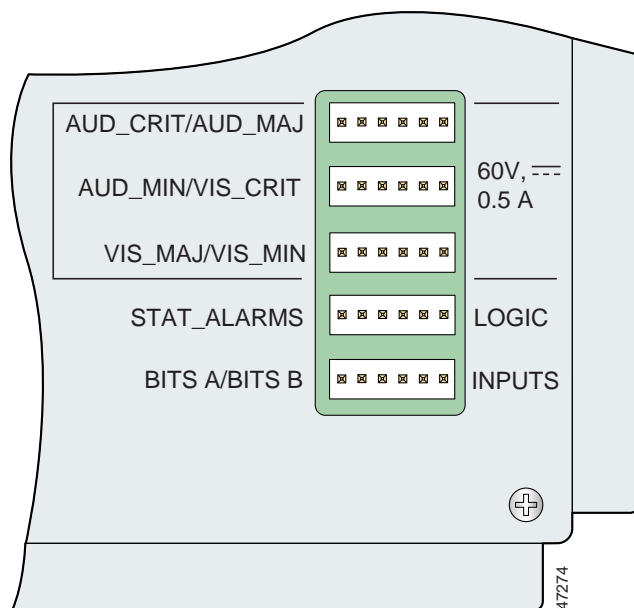
Note

The relay for the circuit-breaker trip alarm is wired through the small green terminal blocks on the rear of the chassis, not through the wire-wrap connector.

Both the alarm relays and the BITS clock connections are optional. If you connect the alarm relays, they transmit critical, major, and minor alarms to a separate, external alarm device. The alarm device uses a bell, light, or some other signal to alert service personnel to the change in system status. If you connect the BITS interface, the Cisco 6160 can receive a clock signal from a T1 line.

Figure 4 shows a close-up of the wire-wrap pins.

Figure 4 DS3/2DS3+8xT1 IMA I/O Card Wire-Wrap Pins Close-Up



These pins support the following alarm functions:

- Visual critical
- Visual major
- Visual minor
- Audible critical
- Audible major
- Audible minor
- Remote alarm cut off
- Reserved (several pins are reserved for future specification)

Alarm pins are wired to both NI-2 cards, however, only one NI-2 card manages the alarms. The alarm cutoff (ACO) switch that is located on the NI-2 card faceplate shuts off the audible alarms generated by the Cisco 6160 system software.

One of the alarm relay functions provided by the wire-wrap connector is an ACO circuit that you can wire to your external alarm device. To use this feature, connect the alarm device so that it can close the contact between pin 5 and pin 6 in the STAT_ALARMS row.

The connector also provides contacts for the following features, all of which can be used (or not used) separately:

- Audible alarms—Wire pins whose signals begin with AUD
- Visible alarms—Wire pins whose signals begin with VIS
- BITS clock—Wire pins whose signals begin with RX_BITS

**Note**

There is one set of contacts for audible alarms and one set for visual alarms. You can use either or both sets of contacts.

You can wire the alarm relay contacts as normally open (NO) or normally closed (NC); however, the ACO circuit can be wired as NO only. Use common (CO) pins for both the NO and NC wiring methods.

Wiring Method	Pins to Use
Normally open	Pin 2 in rows P1, P2, P3 (NO) Pin 5 in rows P1, P2, P3, P4 (NO) Pin 1 in rows P1, P2, P3 (CO) Pin 4 in rows P1, P2, P3 (CO) Pin 6 in row P4 (GND ¹)
Normally closed	Pin 3 in rows P1, P2, P3 (NC) Pin 6 in rows P1, P2, P3 (NC) Pin 1 in rows P1, P2, P3 (CO) Pin 4 in rows P1, P2, P3 (CO)

1. GND = ground

[Table 3](#) maps the wire-wrap pins to the alarms supported by the NI-2 card through the Cisco 6160 backplane.

Table 3 DS3/2DS3+8xT1 IMA I/O Card Wire-Wrap Pin Mapping

Pin	AUD_CRIT/ AUD_MAJ	AUD_MIN/ VIS_CRIT	VIS_MAJ/ VIS_MIN	STAT_ ALARMS	BITS A/BITS B
1	AUD_CRITICAL_CO	AUD_MINOR_CO	VIS_MAJOR_CO	DOOR_ALARM	RX_BITS_TIPA (NI-2 slot 11)
2	AUD_CRITICAL_NO	AUD_MINOR_NO	VIS_MAJOR_NO	STATION_3	RX_BITS_RINGA (NI-2 slot 11)
3	AUD_CRITICAL_NC	AUD_MINOR_NC	VIS_MAJOR_NC	STATION_4	RX_BITS_GND/GND
4	AUD_MAJOR_CO	VIS_CRITICAL_CO	VIS_MINOR_CO	STATION_5	RX_BITS_TIPB (NI-2 slot 10)
5	AUD_MAJOR_NO	VIS_CRITICAL_NO	VIS_MINOR_NO	ACO_NO	RX_BITS_RINGB (NI-2 slot 10)
6	AUD_MAJOR_NC	VIS_CRITICAL_NC	VIS_MINOR_NC	STATION_CO/GND	RX_BITS_GND/GND

**Caution**

Use extreme caution when wire-wrapping the pin connections for the STAT_ALARMS and BITS_A/BITS_B pins. Incorrect wire connections will cause damage to the equipment.

DS3/2DS3+8xT1 IMA I/O Card and NI-2 Card Compatibility

The DS3/2DS3+8xT1 IMA I/O card is compatible with the following NI-2 cards.

- DS3/2DS3
- DS3+T1/E1 IMA
- OC-3c/2DS3
- OC-3c/OC-3c



Note

For NI-2 software and network management compatibility, see [Table 4 on page 8](#).

Specifications

[Table 4](#) lists the specifications of the DS3/2DS3+8xT1 IMA I/O card.

Table 4 DS3/2DS3+8xT1 IMA I/O Card Specifications

Specification	Description
Standards supported	ANSI T1.102
Power consumption	6W
External interfaces	<ul style="list-style-type: none"> • Three DS3 • Eight T1 • Alarm relay • BITS clock
Internal hardware	N/A
Dimensions	Height: 9.0 in. (22.86 cm) Depth: 0.69 in. (1.75 cm) Width: 10.72 in. (27.22 cm)
Weight	1.2 lb (0.544 kg)
Minimum software and network management requirement	Cisco IOS—Release 12.1(6)DA CDM ¹ —Release 3.3(2) (optional)

1. CDM = Cisco DSL Manager

Part and Tool Requirements

[Table 5](#) lists the tools and equipment that you need to install and remove a DS3/2DS3+8xT1 IMA I/O card.

Table 5 *Tool and Equipment Requirements Checklist*

Check	Tools and Equipment
	Hardware Components and Cables
	DS3/2DS3+8xT1 IMA I/O card—Shipped with <ul style="list-style-type: none"> • Twelve standoff screws and washers. • Ten screws. • EMI cover.
	Equipment necessary for ESD protection—You need this equipment whenever you handle Cisco chassis, modules, and cards.
	Tools
	Phillips-head screwdriver.
	1/4 inch socket driver or wrench.
	Software Components
	Cisco IOS or CDM.
	Note See Table 4 for minimum software and network management release requirements.



Caution

Do not exceed a torque control of 4 foot-pounds if you use a power or cordless screwdriver.

General Safety Precautions and Maintenance Guidelines

This section describes the following areas:

- [General Safety Precautions, page 9](#)
- [General Maintenance Guidelines, page 15](#)
- [Preventing Electrostatic Discharge Damage, page 15](#)

General Safety Precautions

Before working on the equipment, be aware of standard safety guidelines and the hazards involved in working with electrical circuitry to prevent accidents. Adhere to the following cautions and warnings and those throughout the guide for safe and hazard-free installation.



Note

To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information for the Cisco 6160 System* document that accompanies this product.



Caution

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



Caution

Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by means of grounding straps to eliminate the risk of ESD damage to the equipment. Equipment is subject to ESD damage whenever it is removed from the chassis.



Caution

Be careful when you remove the standoff screws and reinsert the screws into the screw holes on the backplane so that the backplane circuitry does not become damaged.



Caution

If the cards are installed when you apply power to the system, you could damage the cards and the chassis.



Caution

If fuses are already installed in the fuse and alarm panel, remove them. You can replace the fuses after the I/O card is installed. Do not power up the system while you install and connect the I/O card.



Caution

Static voltages as low as 30 volts can cause latent damage to circuitry on the I/O card. Observe all standard antistatic procedures (for example, wear a grounding strap).



Warning

This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).

Attention	Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document <i>Regulatory Compliance and Safety Information</i> (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.
Warnung	Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument <i>Regulatory Compliance and Safety Information</i> (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.
Avvertenza	Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento <i>Regulatory Compliance and Safety Information</i> (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.
Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet <i>Regulatory Compliance and Safety Information</i> (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento <i>Regulatory Compliance and Safety Information</i> (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.
¡Advertencia!	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado <i>Regulatory Compliance and Safety Information</i> (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.
Varning!	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förekommer i denna publikation i dokumentet <i>Regulatory Compliance and Safety Information</i> (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.



Warning

Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages.



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.



Warning

Read the installation instructions before you connect the system to its power source.



Warning

Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.



Warning

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

This unit should be mounted at the bottom of the rack if it is the only unit in the rack.

When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.



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.



Warning

Class 1 laser product.



Warning

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















Warning

This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.



Warning

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

-  **Warning** This equipment is to be installed and maintained by service personnel only as defined by AS/NZS 3260 Clause 1.2.14.3 Service Personnel.
-  **Warning** A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.
-  **Warning** To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.
-  **Warning** Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.
-  **Warning** During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.
-  **Warning** Use copper conductors only.
-  **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.
-  **Warning** Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
-  **Warning** Connect the unit only to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950 based safety standards.
-  **Warning** Do not use this product near water; for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.
-  **Warning** Never install telephone wiring during an electrical storm.
-  **Warning** Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.



Warning

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.



Warning

Use caution when installing or modifying telephone lines.



Warning

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.



Warning

Do not use a telephone to report a gas leak in the vicinity of the leak.



Warning

Ultimate disposal of this product should be handled according to all national laws and regulations.



Warning

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on the port adapters; these types of handles are not designed to support the weight of the unit. Lift the unit only by grasping the chassis underneath its lower edge.



Warning

This equipment needs to be grounded. Use a green and yellow 14 AWG ground wire to connect the host to earth ground during normal use.



Warning

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.



Warning

The DS3 ports are not intended to be connected to cables that run outside the building where it is installed. For any connections outside the building, the DS3 ports must be connected to a network termination unit (NTU). NTU devices should comply with appropriate national safety standards such as UL 1950, CSA 950, EN 60950, IEC 950, and AS 3260.



Warning

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.



Warning

High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag.

**Warning**

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

General Maintenance Guidelines

This section covers the following topics:

- [Installation and Replacement Suggestions, page 15](#)
- [Hot Swapping Cards, page 15](#)

Installation and Replacement Suggestions

The following are examples of recommended installation and replacement practices:

- Do not force the card into the chassis backplane connectors P3 and P9. This action can damage the pins on the connectors if they are not aligned properly with the I/O card.
- Ensure that the card is straight and parallel to the chassis backplane when you install it onto the connectors. The pins on the connectors can be damaged if the card is not installed correctly.
- Firmly press on the card to ensure that the connectors mate with the chassis correctly.

**Caution**

Any card that is only partially connected to the backplane can disrupt system operation.

Hot Swapping Cards

The DS3/2DS3+8xT1 IMA I/O card is not hot swappable. Removing the DS3/2DS3+8xT1 IMA I/O card will interrupt service for the entire system until the card is replaced.

**Caution**

The DS3/2DS3+8xT1 IMA I/O card must be installed and removed by a trained technician only.

Preventing Electrostatic Discharge Damage

Proper ESD protection is required whenever you handle Cisco equipment. ESD damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Use an antistatic strap when you handle any card or component.

Follow these guidelines to prevent ESD damage:

- Always use an ESD ankle or wrist strap and ensure that the wrist strap makes good skin contact.
- Connect the equipment end of the strap to the ESD jack on the front left side of the chassis.
- When you install a component, use available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help ensure that bus connectors are properly seated.
- When you remove a component, use available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.

- Handle I/O cards by edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static-shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap protects components from ESD voltages on the body only; ESD voltages on clothing can still cause damage.



Caution

Periodically check the resistance value of the antistatic strap. Ensure that the measurement is between 1 and 10 megohms.

Removing and Installing the DS3/2DS3+8xT1 IMA I/O Card

The following sections describe how to remove or install a DS3/2DS3+8xT1 IMA I/O card.



Caution

Proper ESD protection is required whenever you handle Cisco equipment. Installation and maintenance personnel should be properly grounded by means of grounding straps to eliminate the risk of ESD damage to the equipment. Equipment is subject to ESD damage whenever it is removed from the chassis.



Caution

Static voltages as low as 30 volts can cause latent damage to circuitry on the I/O card. Observe all standard antistatic procedures (for example, wear a ground strap).

Removing the DS3/2DS3+8xT1 IMA I/O Card

Complete the following steps to remove the DS3/2DS3+8xT1 IMA I/O card from the chassis backplane:



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 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 cable and wire at both ends to identify its destination.

Step 1 Connect a grounding strap to the ESD grounding jack on the chassis.

Step 2 Power off the Cisco 6160.

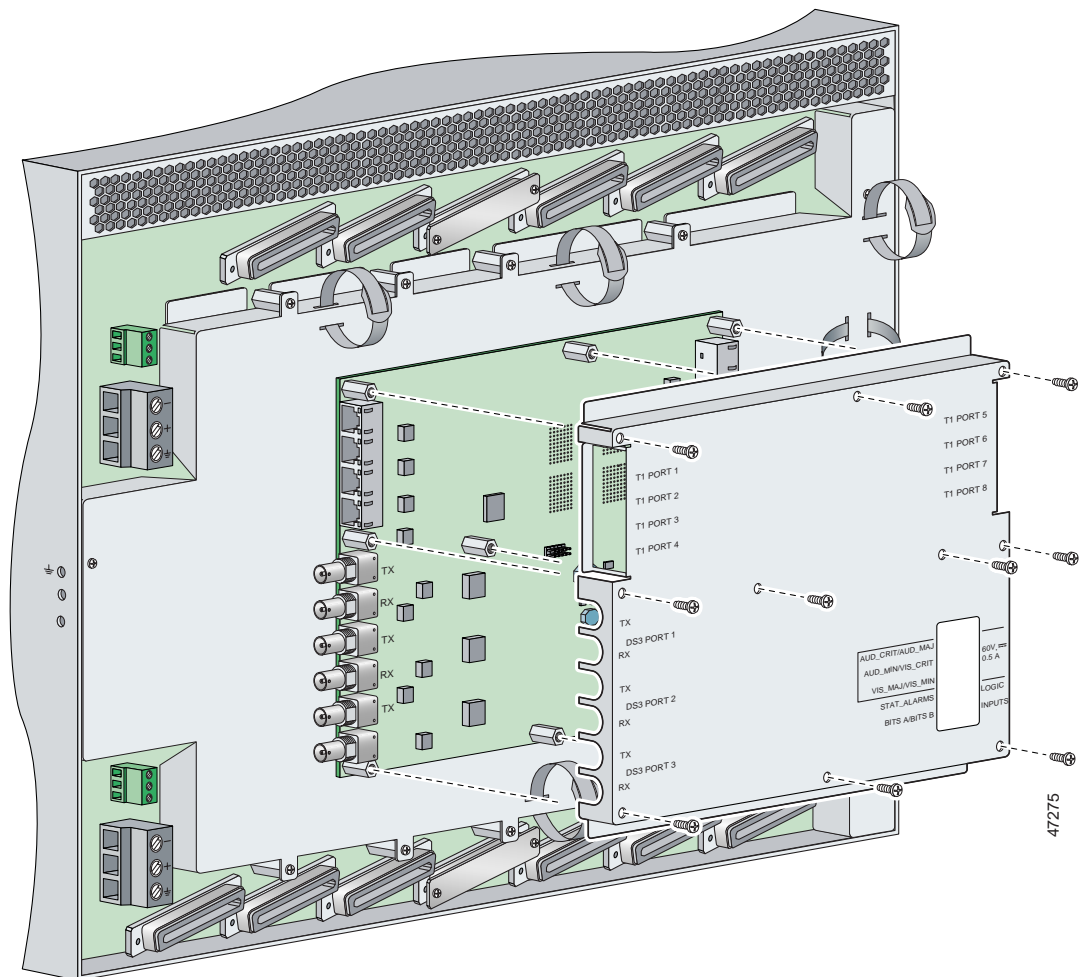
- Type the following command to save the configuration changes to NVRAM:

```
DSLAM# copy running-config startup-config
```

- Set the circuit breakers on both power entry modules (PEMs) to the OFF (0) position.

- Step 3** Mark and disconnect all DS3 coaxial cables from the six BNC connectors (DS3 Port 1 through Port 3) on the I/O card, as necessary. Each port has a TX and an RX connection.
See [Figure 2 on page 3](#) for the DS3 BNC connector locations.
- Step 4** Mark and disconnect all T1 wires from the eight RJ-48c receptacles (T1 Port 1 through Port 8) on the I/O card, as necessary.
See [Figure 2 on page 3](#) for the T1 receptacle locations.
- Step 5** Mark and disconnect all wires from the I/O card wire-wrap pins.
See [Figure 2 on page 3](#) for the wire-wrap pin locations.
- Step 6** Use a Phillips-head screwdriver to remove the ten screws from the I/O card EMI cover, as shown in [Figure 5](#).

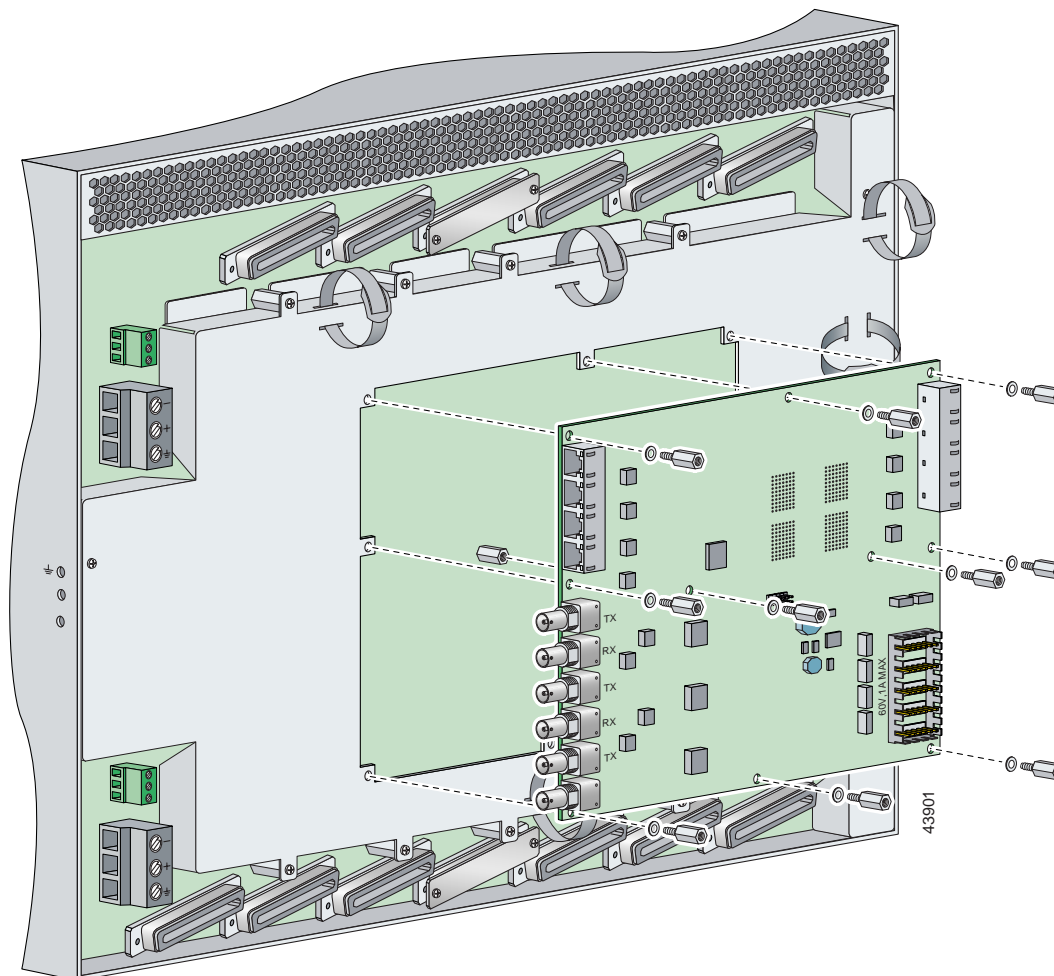
Figure 5 EMI Cover Removal



- Step 7** Carefully lift the EMI cover off of the I/O card.

- Step 8** Use a 1/4 inch socket driver or wrench to remove the ten standoff screws and washers that attach the I/O card to the chassis, as shown in [Figure 6](#).

Figure 6 I/O Card Removal



- Step 9** Grasp the sides, or top and bottom, of the I/O card, and carefully pull the I/O card away from the P3 and P9 connectors on the Cisco 6160 backplane.
- Step 10** Place the I/O card in an antistatic bag or in a box lined with antistatic material.
- Step 11** Store the removed screws, standoff screws, washers, and EMI cover in a safe place for reinstallation.
- See the [“Installing the DS3/2DS3+8xT1 IMA I/O Card”](#) section on page 19 for I/O card installation procedures.

Installing the DS3/2DS3+8xT1 IMA I/O Card

Complete the following steps to install the DS3/2DS3+8xT1 IMA I/O card from the chassis backplane:

**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 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 an ESD grounding jack on the chassis.
 - Step 2** Verify that your configuration is saved to NVRAM.
 - Step 3** Verify that the circuit breakers on both PEMs are turned to the OFF (0) position.
 - Step 4** Use a 1/4 inch socket driver or wrench to tighten the two standoff screws. One standoff screw is located to the left of the P9 connector and the other is located to the right of the P3 connector.

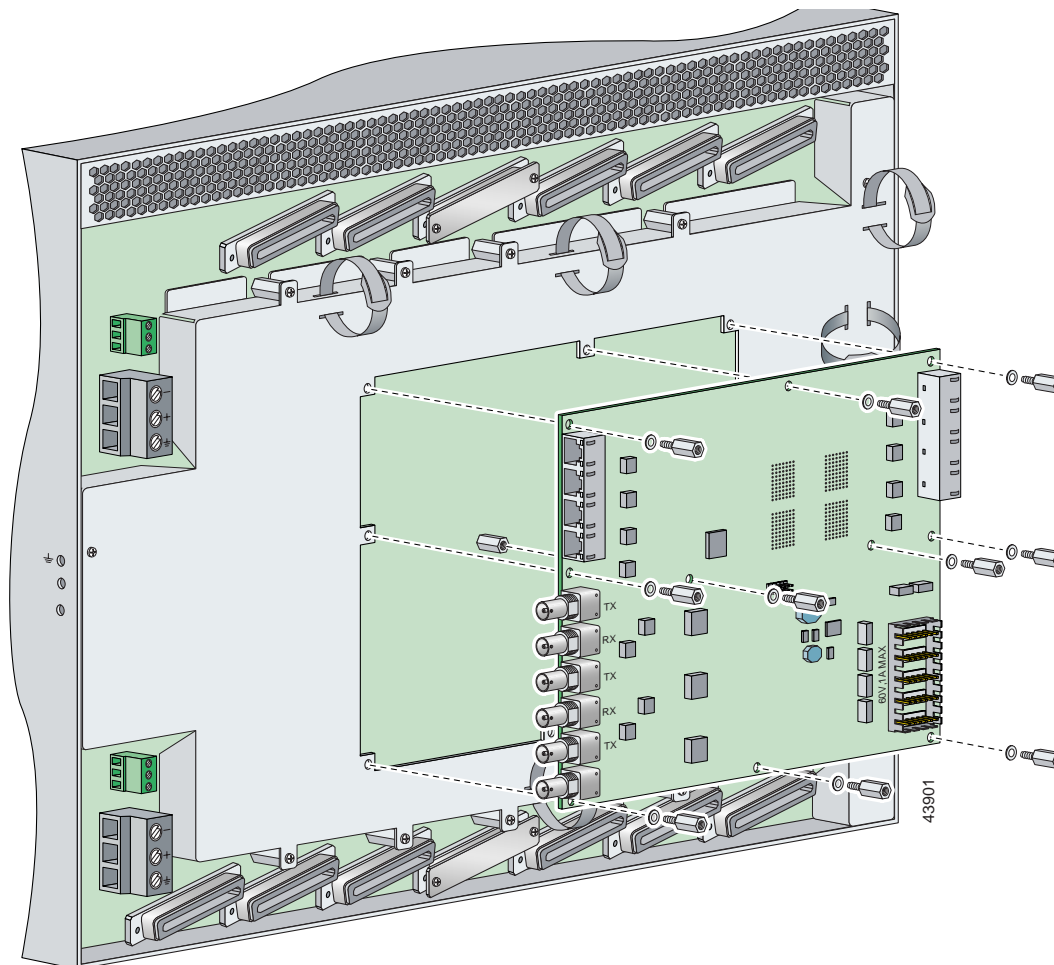
**Caution**

Be careful not to damage backplane circuitry when you tighten the standoff screws on the backplane.

- Step 5** Hold the I/O card vertically with its component side (primary side) facing you and align the I/O card over the two standoff screws.

- Step 6** Carefully press J15 and J16 receptacles on the I/O card onto the P3 and P9 connectors on the chassis backplane until the I/O card is in place and against the two standoff screws, as shown in [Figure 7](#).

Figure 7 I/O Card Placement on P3 and P9 Connectors



- Step 7** Ensure that all of the mounting holes on the I/O card line up with the standoff screw holes on the backplane.
- Step 8** Fasten the I/O card to the Cisco 6160 backplane by inserting the ten standoff screws and washers into the ten standoff screw holds in the I/O card, as shown in [Figure 7](#).
- Step 9** Use a 1/4 inch socket driver or wrench to tighten the ten standoff screws as necessary.



Caution Do not exceed a torque control of 4 foot-pounds. Doing so can damage the I/O card.

- Step 10** Align the ten mounting holes on the EMI cover with the ten standoff screws installed on the I/O card.

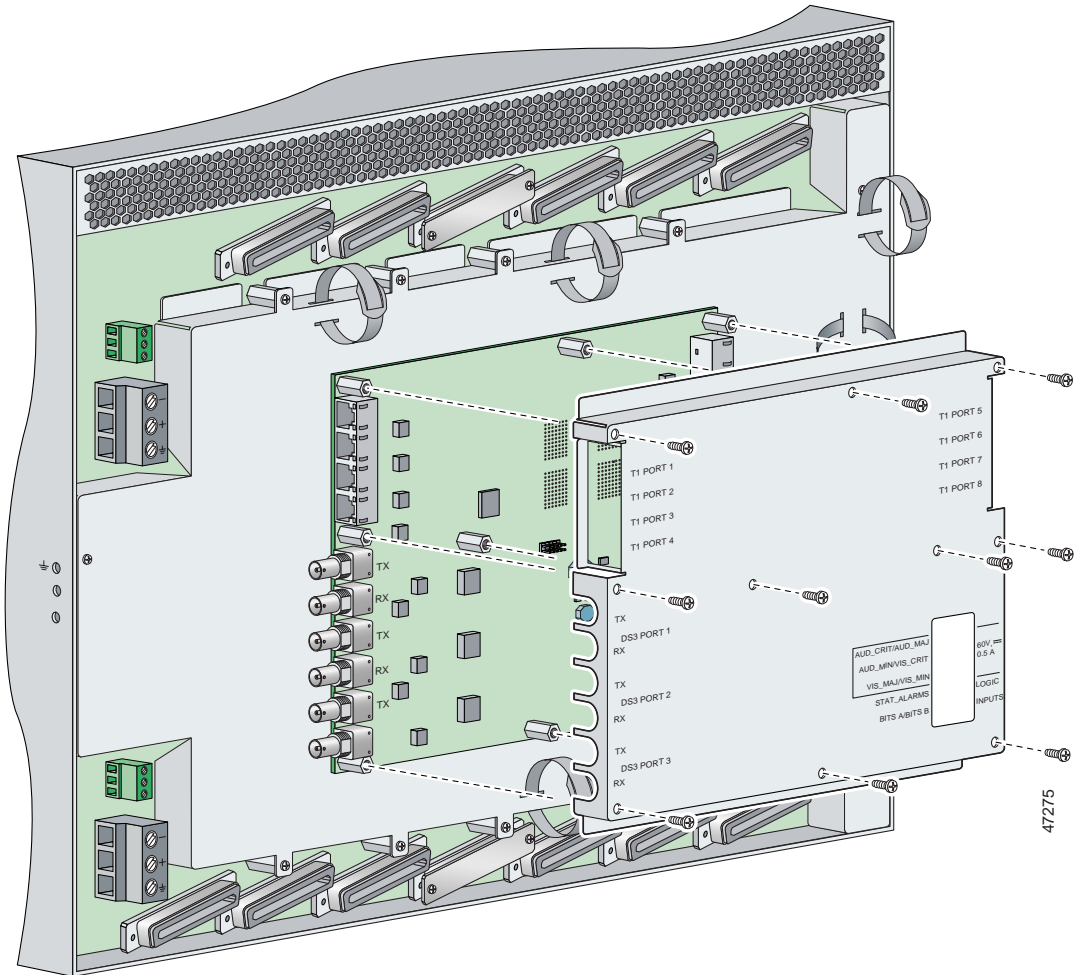
- Step 11** Use a Phillips-head screwdriver and ten screws to attach the EMI cover to the I/O card, as shown in [Figure 8](#).



Caution

Do not exceed a torque control of 4 foot-pounds.

Figure 8 EMI Cover Installation



- Step 12** If you disconnected the wire from the wire-wrap pins in the [“Removing the DS3/2DS3+8xT1 IMA I/O Card”](#) section on page 16, reconnect them.
- Step 13** If you disconnected the T1 wires from the RJ-48c receptacles in the [“Removing the DS3/2DS3+8xT1 IMA I/O Card”](#) section on page 16, reconnect them.
- Step 14** If you disconnected the DS3 coaxial cables from the BNC connectors in the [“Removing the DS3/2DS3+8xT1 IMA I/O Card”](#) section on page 16, reconnect them.
- Step 15** Set the circuit breakers on each PEM to the ON (I) position.



Note

The OUT FAIL LED might blink briefly.

Step 16 Verify that the INPUT OK LED is green.



Note If the INPUT OK LED is not green or if other issues arise, refer to the *Cisco 6160 Hardware Installation Guide* for troubleshooting procedures.

Step 17 Reboot the system to reassociate the system MAC address.

Step 18 Confirm that the Cisco IOS software recognizes the new I/O card.

a. Type the following command:

```
DSLAM# show hardware
```

b. Scroll through the data and locate the I/O card information.

The information displayed on the screen will be similar to the following output:



Note The command output below is an example display. Slots 1–9 and slots 12–34 are available for line cards and slot 11 is for a secondary NI-2 card.

```
Chassis Type: C6160
I/O Card: 6160-DS3+8T1-IO
Slot 1 : EMPTY Slot 19: EMPTY
Slot 2 : EMPTY Slot 20: EMPTY
Slot 3 : EMPTY Slot 21: EMPTY
Slot 4 : EMPTY Slot 22: EMPTY
Slot 5 : EMPTY Slot 23: EMPTY
Slot 6 : EMPTY Slot 24: EMPTY
Slot 7 : EMPTY Slot 25: EMPTY
Slot 8 : EMPTY Slot 26: EMPTY
Slot 9 : EMPTY Slot 27: EMPTY
Slot 10:NI-2-155MM-155MM
Slot 11:EMPTY
Slot 12: EMPTY Slot 28: EMPTY
Slot 13: EMPTY Slot 29: EMPTY
Slot 14: EMPTY Slot 30: EMPTY
Slot 15: EMPTY Slot 31: EMPTY
Slot 16: EMPTY Slot 32: EMPTY
Slot 17: EMPTY Slot 33: EMPTY
Slot 18: EMPTY Slot 34: EMPTY
Fan Module 1: Present 2: Present
Power Supply Module 1: 6160-PEM-DC
Power Supply Module 2: EMPTY
```



Note If the information displays as “Unreadable” or “Unknown”, the I/O card was not installed properly or a problem exists with the I/O card. Install the I/O card again by following the procedures in this section. If the I/O card is still not recognized by the system, refer to the *Cisco 6160 Hardware Installation Guide* for troubleshooting procedures.

Standards and Certifications

Table 6 details the standards and certifications for the DS3/2DS3+8xT1 IMA I/O card.

Table 6 *Standards and Certifications*

Discipline	Compliance Standard
Product Safety	UL 1950, 3rd Edition EN 60950 2nd Edition, Amendments 1, 2, 3, 4, 11 IEC 60950 2nd Edition, Amendments 1, 2, 3, 4 AS/NZS 3260
Emissions	FCC Part 15 CISPR 22 ICCS-003
NEBS	Telcordia GR-63-CORE Telcordia GR-1089-CORE Telcordia SR-3580 Level 3
Telecom	FCC Part 68 ICCS-003

Emissions Statements

This section contains statements on Cisco 6160 compliance to the emissions standards of the United States, Canada, and Japan.

Statement for the United States: FCC Class A

Modifying the equipment without Cisco's authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

Statements for Canada

This section applies to models used in Canada.



Note

The Class B digital apparatus complies with Canadian ICES-003.

Equipment Attachment Limitations

An Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the companies inside wiring associated with a single

line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution**

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

English: This Class A digital apparatus complies with Canadian ICES-003.

French: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Related Documentation

A complete list of all DSL product related documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/index.htm

Obtaining Documentation

The following sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following URL:

<http://www.cisco.com>

Translated documentation is available at the following URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription. Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

<http://www.cisco.com/go/subscription>

Documentation Feedback

If you are reading Cisco product documentation on Cisco.com, you can submit technical comments electronically. Click **Leave Feedback** at the bottom of the Cisco Documentation home page. After you complete the form, print it out and fax it to Cisco at 408 527-0730.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, write to the following address:

Cisco Systems
Attn: Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

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- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

<http://www.cisco.com>

Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available through the Cisco TAC: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Inquiries to Cisco TAC are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

Cisco TAC Web Site

The Cisco TAC Web Site allows you to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to the following URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to the following URL to register:

<http://www.cisco.com/register/>

If you cannot resolve your technical issues by using the Cisco TAC Web Site, and you are a Cisco.com registered user, you can open a case online by using the TAC Case Open tool at the following URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; these classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled; for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). In addition, please have available your service agreement number and your product serial number.

This document is to be used in conjunction with the documents listed in the [“Related Documentation”](#) section.

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