



Cisco StadiumVision Director Server HARDWARE INSTALLATION GUIDE

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Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

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Cisco StadiumVision <insert name of guide here>

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Preface

This document provides StadiumVision technical engineers and product manager's guidelines and techniques for implementing the SV Director Server. Additionally, Sales and marketing people can use this document as a master reference guide when helping customers understand and order the components they need to deploy the SV Director Server with their StadiumVision solution.

Document History

Table 1. Revision History

Date	Revision	Author	Comments
5/9/2010	0	Trish McBride	First release for StadiumVision R2.3.

Chapter 1 Overview

StadiumVision is a proven, end-to-end, high-definition IPTV solution that provides advanced video content management and delivery. It is a centrally-managed, video processing and distribution solution that enables the integration and automated delivery of customized and dynamic content from multiple sources to different areas of the stadium in Standard Definition (SD), High Definition (HD), or both.

StadiumVision is purpose-built for sports and entertainment venues, which have extensive video systems deployed throughout and is designed to enhance the viewing of live events and to provide in-house advertising. In addition, it leverages video systems in restaurants, clubs, and luxury suites to allow fans to view both in-house programming as well as external network channels.

Cisco StadiumVision can help sports executives and venue operators:

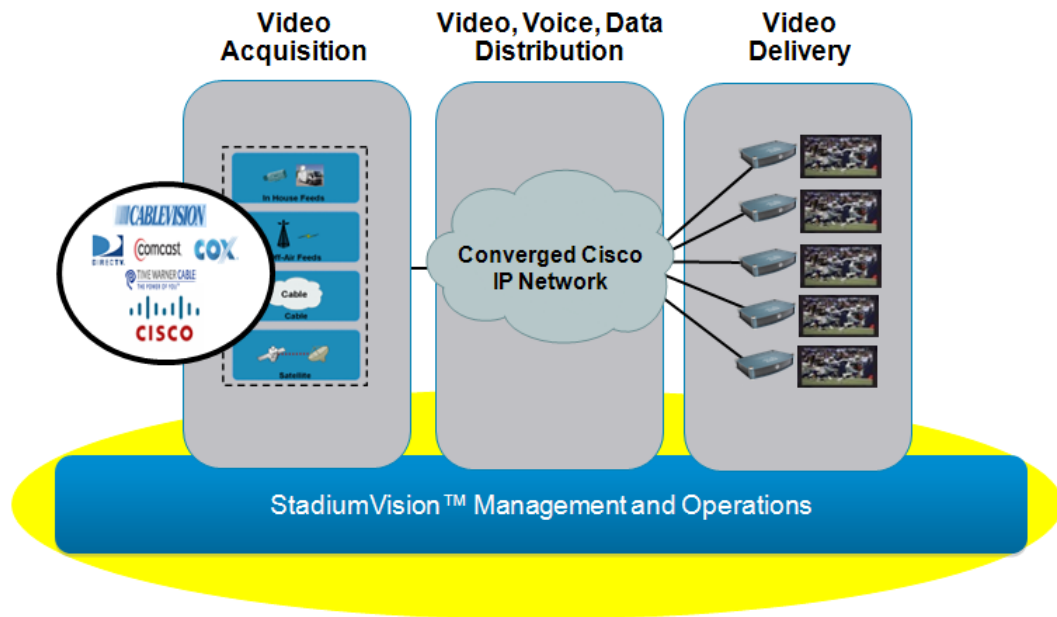
- Create personalized experiences to increase fan loyalty, differentiate the venue, and extend their brand.
- Enable new, revenue-generating applications for advertising, ticketing, merchandising, and concessions.
- Gain the flexibility to easily support new types of events.
- Streamline event-day operations, improving staff productivity and responsiveness.
- Create more secure, efficient, and cost-effective venues.

StadiumVision Components

StadiumVision comprises four major components, as shown in Figure 1:

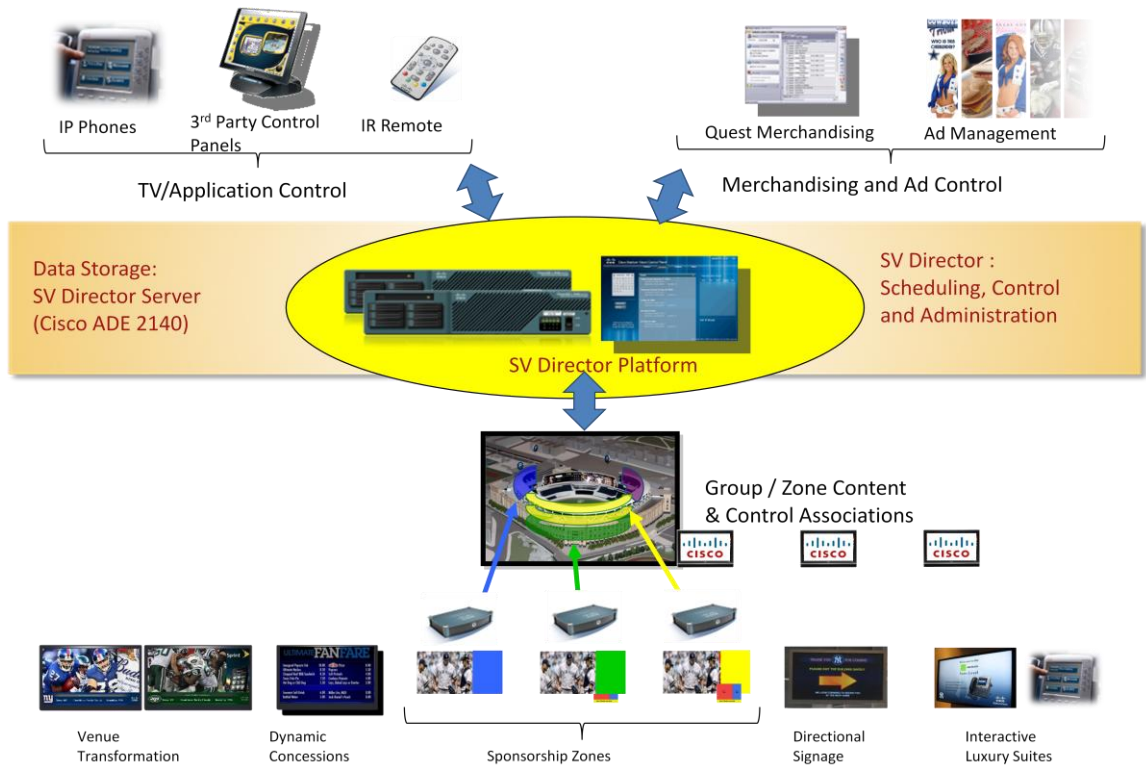
- Video acquisition (or video head end)
- Converged voice, video, and data high-speed IP network
- Video delivery (and signage playback)
- Centralized management and operations

Figure 1. StadiumVision Major Components



As part of the management and operations component highlighted in yellow, Cisco StadiumVision uses the Cisco ADE 2140 Series appliance to host the SV Director platform and software that manages and controls the venue's script, content, and endpoints. This content is displayed on the TVs that are mounted throughout the venue. Refer to Figure 2.

Figure 2. SV Director Server Integration with StadiumVision



SV Director Server Overview

The Cisco Application Deployment Engine (ADE) 2140 Series appliance shown in Figure 3 is the SV Director Server. The Cisco ADE 2140 is a computing-optimized high availability 2RU platform specifically designed to host the SV Director application for Cisco StadiumVision. This platform maximizes processing power using dual quad core processors with double data rate two RAM combined with dual gigabit Ethernet interfaces to provide a platform that can operate an entire StadiumVision venue.

Figure 3. Cisco SV Director Server (Cisco ADE 2140) Front Panel



Figure 4. Cisco SV Director Server (Cisco ADE 2140) Rear Panel



The platform provides:

- 64 bit computing with dual Intel L5410 Xeon 2.33GHz quad-core processors with a 1333 MHz front side bus (FSB) and 12MB of Level 2 cache.
- PC2-5300, Error Checking and Correcting (ECC), Double Data Rate 2 (DDR2), Fully Buffered Synchronous Dynamic RAM (SDRAM); 8 slots, 4 slots populated with 8GB of SDRAM, and 16GB maximum capacity
- Two integrated 10/100/1000T gigabit Ethernet Network Interface Controller (NICs) ports
- Six Serial Attached SCSI hard-disk drive bays, two populated with hot swappable 147GB server grade drives
- Hardware RAID controller with 128MB of battery backed write cache memory.
- Factory installed drives configured in RAID1 configuration.
- Dual Redundant Hot Swap AC Power Supplies.
- 4 Post Rail Kit included for four sided server rack installations.
- 2RU (3.4in. / 8.6 cm height) form factor, 20.2 in / 51.2 cm depth.

Key Features and Benefits

Performance

The platform is built for speed, employing 8 dual quad 64-bit core processors. Combining that with error checking and correcting, a double data rate, two fully-buffered RAM, and two Gigabit Ethernet interfaces creates the optimal platform to host Cisco StadiumVision Director software.

Variable Speed Fans

The platform includes variable-speed fans to reduce operating noise. Through the use of temperature sensors within the server, the speed of the fans is adjusted to maintain the proper cooling. This reduces the noise generated by the fans by operating them only when required and at a speed based upon the cooling requirements.

System Diagnostic LED

The platform provides a system error LED on the front of the server to make pin-pointing system issues simple. If no failures have occurred, the system error LED is not lit.

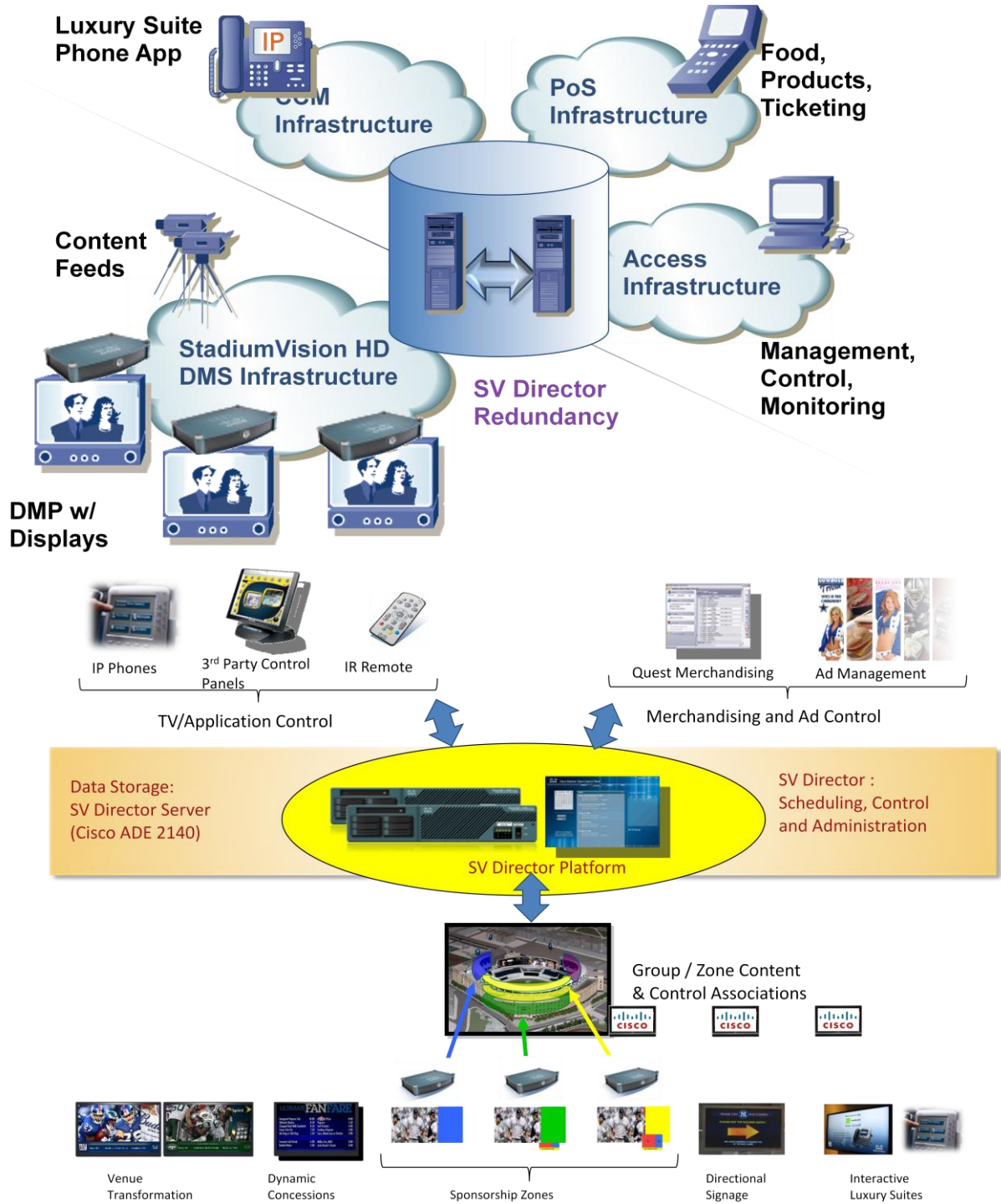
High Availability

- Error Checking and Correction (ECC) Memory.
- RAID 1 hardware fault tolerance from disk errors and failure of either drive.
- 128 MB of batter backed write cache memory on RAID card.
- Dual redundant hot swap AC power supplies, each with own power cord.

SV Director Server Redundancy

The SV Director Server platform is deployed in a dual configuration providing for warm standby redundancy. Refer to Figure 5.

Figure 5. Building the capability of redundancy



Power Redundancy

The SV Director Server can operate with a single power supply despite being outfitted with two, thereby providing internal power redundancy. This can be extended externally to the server by employing a strategy that ensures at least one of the power supplies is receiving power at all times. Power to the SV Director Server should preferably be split between two differing sources, one source that has redundancy like a UPS, and the other source from a differing

circuit than the first. By splitting the sources of power, one circuit can fail or have maintenance work done and the other will keep the server running.

RAID Redundancy

Planning for disk redundancy means employing the hardware assisted Redundant Array of Independent Disks (RAID) feature on the SV Director Server. The embedded RAID BIOS Configuration Utility makes this a simple process. The two 147 GB disks are configured for RAID 1 enabling the disks to be mirrored. Should either disk fail, the opposite will contain an exact copy of the data, providing redundancy.

In release 2.0, the RAID is automatically configured when you install SV Director from the DVD.

Platform Redundancy

Platform redundancy has an optional cold standby SV Director Server ready in case a serious hardware failure occurs on the primary server. Should this occur, one or both of the drives from the primary can be moved to the secondary. This hardware-based approach will cover many scenarios; therefore it is recommended to have dual SV Director Servers at a venue.

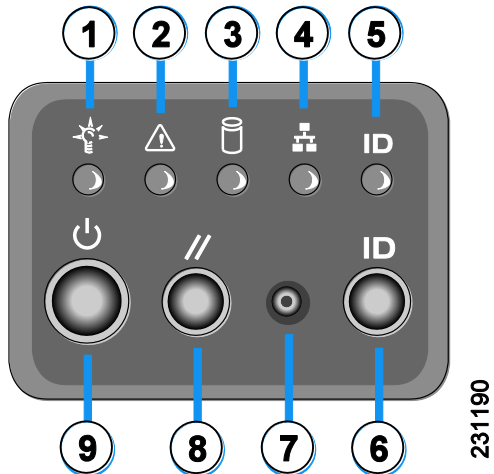
SV Server Hardware Features

This section illustrates and describes the front- and rear-panel controls, ports, and LED indicators on the SV Director Server (Cisco ADE 2140 Series appliance).

Front Panel

Figure 6 illustrates and defines the SV Director Server front panel components. Figure 7 illustrates and defines the front panel LEDs and switches.

Figure 7. SV Director Server Front Panel LEDs and Switches

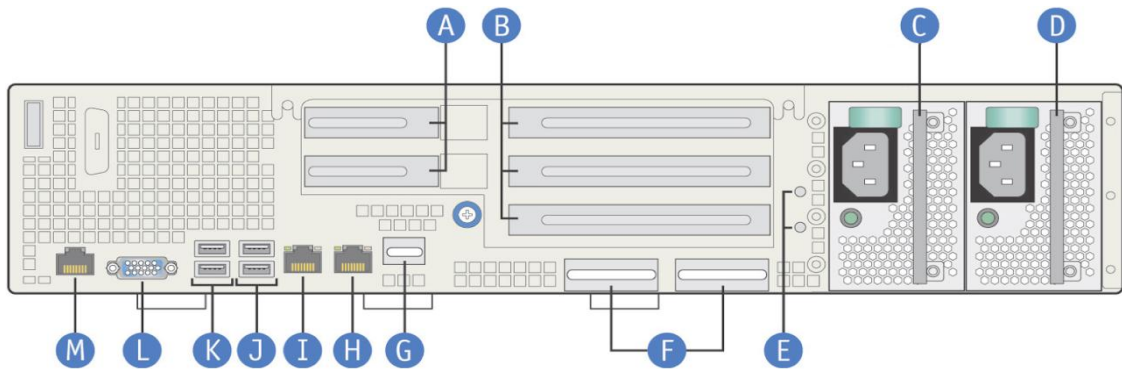


LED	Color	State	Description
1	Green	On	Power on.
		Off	Power off.
2	Green	On	Standby or ready for operation.
	Green	Blinking	Degraded operation (for example, power supply non-redundancy, part of system memory mapped out of BIOS).
	Amber	On	One or more critical fault conditions.
	Amber	Blinking	One or more noncritical fault conditions.
3	Green	On	Hard disk drive activity. This is an aggregated indication for all hard disk drives. Each hard disk drive contains its own activity and fault LEDs.
	Amber	On	Hard disk drive fault. This is an aggregated indication for all hard disk drives. Each hard disk drive contains its own activity and fault LEDs.
4	Green	On	NIC activity.
5	Blue		System identity. LED can be toggled remotely or by the front-panel ID switch to obtain the system's identity.
6	Switch		Toggles appliance ID LED
7	Switch		Asserts the NMI (non-maskable interrupt) to the processor on the appliance. When pressed, clears the processor allowing the processor to continue to execute the software normally.
8	Switch		Resets the appliance.
9	Switch		Toggles the appliance power

Rear Panel

Figure 8 illustrates and defines the SV Director Server rear panel components.

Figure 8. SV Director Server Rear Panel

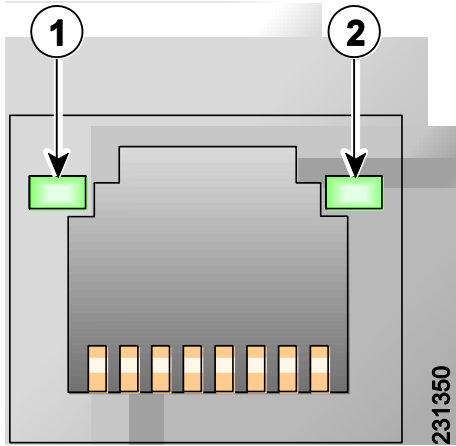


Description	
A	Two low-profile PCI Express adapter card slots
B	Three full-height PCI-X 133-MHz adapter card slots
C	AC power supply
D	AC power supply
E	Grounding lugs (for AC)
F	Optional I/O module ports (filler panel shown)
G	Optional GCM port (filler panel shown)
H	RJ-45 NIC connector 2
I	RJ-45 NIC connector 1
J	USB ports
K	USB ports
L	Video connector
M	RJ-45 serial port (COM 2)

NIC LEDs

The rear panel includes LEDs (a green LED to the left of the connector and a bi-color [green/amber] LED to the right of the connector) that indicate the connection activity and speed of the NIC ports. See Figure 9.

Figure 9. NIC LEDs



LED	Color	State	Description
1	Off	Off	10 Mbps connection
	Green	Solid	100 Mbps connection
	Amber	Solid	1000 Mbps (or 1-Gbps) connection
2	Off	Off	No network connection
	Green	Solid	Network connection
	Green	Blinking	Transmit/receive activity

AC Power Supply LEDs

The AC power supply LEDs indicate the power status of the AC power supplies. Refer to Table 2.

Table 2. AC Power Supply LEDs

Color	State	Description
Off	Off	No AC input power to power supply
Green	Blinking	AC power applied to power supply and standby voltages are available
Green	Solid	All power available
Amber	Blinking	AC power supply warning due to over-current or over-temperature condition or slow fan
Amber	Solid	AC power supply failed or shut down due to blown fuse, high over-current or over-temperature condition, or fan failure

Input/Output Ports and Connectors

The SV Director Server rear panel includes the following I/O connectors:

- Ethernet connectors
- Serial connector
- Video connector
- Mouse connector
- Keyboard connector

Warning! To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. **Statement 1021**

Ethernet Port (NIC 1 and NIC 2)

The SV Director Server comes with two integrated dual-port Ethernet controllers (1 and 2). These controllers provide an interface for connecting to 10 Mbps, 100 Mbps, or 1000 Mbps networks and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet Local Area Network (LAN).

The server comes with an Ethernet RJ-45-to-RJ-45 yellow cable.

To access the Ethernet port, connect a Category 3, 4, 5, 5E, or 6 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the back of the appliance. See Table 3.

Table 3. Ethernet Cabling Guidelines

Type	Description
10 BASE-T	EIA Categories 3, 4, or 5 UTP (2 or 4 pairs) up to 328 ft (100 m)
100 BASE-TX	EIA Category 5 UTP (2 pairs) up to 328 ft (100 m)
1000 BASE-T	EIA Category 6 (recommended), Category 5E or 5 UTP (2 pairs) up to 328 ft (100 m)

Ethernet Port Connector

Figure 10 shows the Ethernet RJ-45 port and plug.

Figure 10. RJ-45 Port and Plug

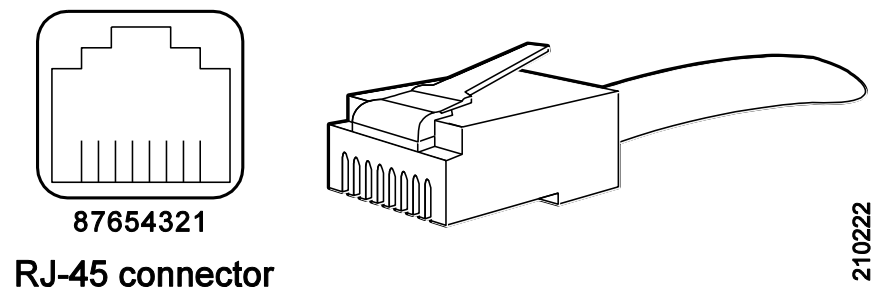


Table 4 lists the RJ-45 pin signals used on the connector.

Table 4. Ethernet Port pinout

Ethernet Port Pin	Signal	Description
1	BI_DA+	Bidirectional pair A, +
2	BI_DA-	Bidirectional pair A, -
3	BI_DB+	Bidirectional pair B, +

4	BI_DC+	Bidirectional pair C, +
5	BI_DC-	Bidirectional pair C, -
6	BI_DB-	Bidirectional pair B, -
7	BI_DD+	Bidirectional pair D, +
8	BI_DD-	Bidirectional pair D, -

NIC 1 and NIC 2 (RJ-45) Ethernet Connections

The NIC 1 and NIC 2 connections support 10 BASE-T, 100 BASE-TX, and 1000 BASE-T standards. The transmission speed of the Ethernet ports is autosensing by default and is user configurable.

See [Table 4](#) for the pinout of the RJ-45 Ethernet port and the modular cable plug it accepts.

Serial (Console) Port Connections

The console port on the SV Director Server includes an EIA/TIA-232 asynchronous serial (RJ-45) connector. This serial console connector (port) allows you the capability to access the appliance locally by connecting a terminal—either a PC running terminal-emulation software or an ASCII terminal—to the console port.

To connect a PC running terminal-emulation software to the console port, use an RJ-45-to-RJ-45 rollover cable and an RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL). For more information see [Serial \(Console\) Port Connections](#).

The default parameters for the console port are 9600 baud, 8 data bits, no parity, 1 stop bit, and no hardware flow control.

Serial (Console) Port

The SV Director Server has two standard serial (console) ports. It comes with a console port cable kit that contains the cable and adapter to connect a console terminal (an ASCII terminal or PC running terminal-emulation software). The console cable kit includes the following items:

- RJ-45-to-RJ-45 rollover cable (light blue)
- RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL)

Use the configuration/setup utility program to change the port address assignments.

Note: The configuration/setup utility program is located in the Cisco ADE 2140 Series appliance ROM and can be accessed through the serial (console) port.

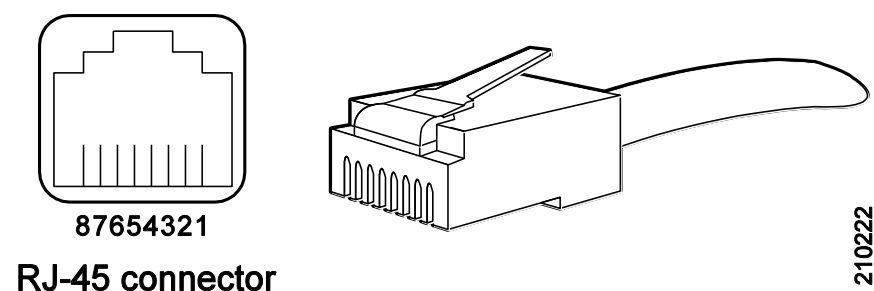
Serial (Console) Port Connector

The SV Director Server has an RJ-45 serial port connector located on the rear panel. This connector is shared with the RJ-45 serial port connector located on the front panel.

When one RJ-45 serial port connector is in use, the other is disabled. For example, if the rear-panel RJ-45 serial port connector is in use, the front-panel RJ-45 serial port connector is disabled and vice versa.

Figure 11 shows the pin number assignments for the RJ-45 serial (console) port connector on the back or front of the appliance. These pin number assignments conform to industry standards.

Figure 11. Serial Port Connector



Note: The serial (console) RJ-45 port pinout differs slightly between the front- and rear-panel ports, specifically in relation to Pin 6 and Pin 7.

On the front-panel serial (console) port, Pin 6 is used as a serial port selection input. Grounding the signal on Pin 6 disables the rear-panel serial (console) port so that the front-panel port is active. This feature allows you to plug into and use the front-panel port without regard to whether anything is connected to the rear-panel port.

Table 5 lists the front-panel serial (console) port pinout descriptions.

Table 5. Front-Panel RJ-45 Serial (Console) Port pinout

Serial Port Pin	Signal	Description
1	RTS	Request to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	Earth ground
5	In Use	When grounded, indicates that the port is routed to the front-panel port.
6	RXD	Receive data
7	DSR	Data set ready
8	CTS	Clear to send

On the rear-panel serial (console) port, Pin 7 can be configured with a jumper located on the appliance motherboard. This jumper allows you to set Pin 7 to either Data Set Ready (DSR) or Data Carrier Detect (DCD) as might be required when using a serial port concentrator. The default jumper configuration selects the DSR signal, which conforms to the Cisco serial port standard.

Table 6 defines the rear-panel serial (console) port pinout.

Table 6. Rear-Panel RJ-45 Serial (Console) Port pinout

Serial Port Pin	Signal	Description
1	RTS	Request to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	Earth ground
5	GND	Earth ground
6	RXD	Receive data
7	DSR or DCD	Data set ready or data carrier detect
8	CTS	Clear to send

Serial (Console) Port Cables

Use the thin, flat, RJ-45-to-RJ-45 rollover cable and the RJ-45-to-DB-9 female DTE adapter (labeled TERMINAL) to connect the console port to an ASCII terminal or a PC running terminal-emulation software. Table 7 defines the pinout for the asynchronous serial console port, the RJ-45-to-RJ-45 rollover cable, and the RJ-45-to-DB-9 female DTE adapter.

Table 7. Serial Console Port Signaling and Cabling Using a DB-9 Adapter

Console Port (DTE)	RJ-45-to-RJ-45 Rollover Cable		RJ-45-to-DB-9 Terminal Adapter (Connected to Rollover Cable)	Console Device
Signal	RJ-45 Pin	RJ-45 Pin	DB-9 Pin	Signal
RTS	1	8	8	CTS
DTR	2	7	6	DSR
TXD	3	6	2	RXD
GND	4	5	5	GND
GND	5	4	5	GND
RXD	6	3	3	TXD
DSR	7	2	4	DTR
CTS	8	1	7	RTS

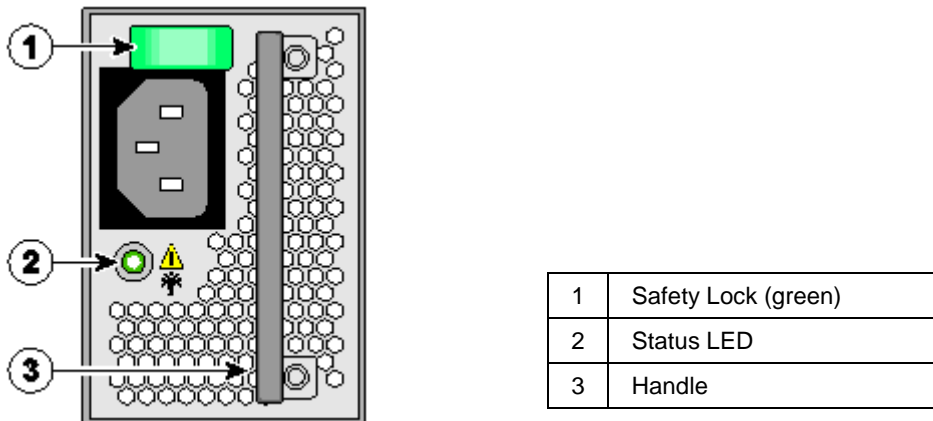
AC Power Supplies

The SV Director Server requires two 110-V or 220-V AC power supplies.

The AC power supplies operate in redundant mode. The power supply is rated for 600-W output capacity in full AC input voltage.

Each power supply incorporates a single 40-mm fan for cooling, which also contributes to overall appliance cooling. The cooling air enters the power supply from the power distribution side. If airflow through the power supply is insufficient, the over-temperature protection circuits activate a shutdown before the temperature passes the maximum rated temperature.

Figure 12. AC Power Supply



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. **Statement 1029**

To maintain hot-swap capability, ensure that an active power supply is in both power supply slots before replacing (hot-swapping) a power supply. Check the power supply LED to determine which power supply module has failed.

Warning! Never install an AC power module and a DC power module in the same chassis. **Statement 1050**

AC Power Supply Input

A single receptacle is provided at the rear of the AC power supply for AC input. Table 8 lists the pinout configuration for the connector.

Table 8. Power Supply Connector pinout

Pin Label	-48 VDC Power Source
-	-48 VDC
+	RTN (reference)

Environmental Monitoring

The SV Director Server has protection circuits that monitor and detect over-current, over-voltage, and over-temperature conditions inside the appliance. If

the power supply shuts down or latches off, a cycle of off for 15 seconds and on for 1 second will reset the power supply.

Over-current Protection (OCP)

The power supply shuts down and latches off after an over-current condition occurs. This latch is cleared by a power interruption.

The power supply will not be damaged from power cycling.

Over-voltage Protection (OVP)

The power supply shuts down and latches off after an overvoltage condition occurs. This latch is cleared by a power interruption.

Over-temperature Protection (OTP)

The power supply is protected against over-temperature conditions caused by the loss of fan cooling or excessive ambient temperature. In an OTP condition, the power supply will shut down. When the power supply temperature drops to the rated safety limit, the power supply restores power automatically.

Regulatory Compliance

For regulatory compliance and safety information, see the *Cisco Regulatory Compliance and Safety Information for the Cisco Application Deployment Engine (ADE) 2130 and 2140 Series Appliance* document that ships with the product and is also available on www.cisco.com.

Chapter 2 Site Preparation and Planning

This chapter describes the tasks you must perform before you install the SV Director Server including:

- [Safety Precautions](#)
- [Site Preparation](#)
- [Unpacking and Checking the Contents of Your Shipment](#)
- [Required Tools and Equipment](#)
- [Cable Management](#)
- [Installation Checklist](#)

Warning! Only trained and qualified personnel should be allowed to install, replace, or service this equipment. This equipment contains an energy hazard. Disconnect the system before servicing. **Statement 186**

Warning! Read the installation instructions before you connect the system to its power source. **Statement 10**

Note: Read the *Regulatory Compliance and Safety Information for the Cisco Application Deployment Engine (ADE) 2130 and 2140 Series Appliance* document and the *Site Preparation and Safety Guide* for your SV Director Server before you begin the installation.

Safety Precautions

Observe the following safety precautions when using and working with your appliance:

- Observe and follow service markings. Do not service any Cisco product except as explained in this document. Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to electrical shock. Components inside these compartments should be serviced only by an authorized service technician.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your authorized service provider:
 - The power cable or plug is damaged.
 - An object has fallen into the product.
 - The product has been exposed to water.
 - The product has been dropped or damaged.
 - The product does not operate correctly when you follow the operating instructions.
- Keep the server away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on the server, and never operate the product in a wet environment.
- Do not push any objects into the openings of the server. Doing so can cause fire or electric shock by shorting out interior components.

- Use the product only with other equipment approved by Cisco.
- Allow the product to cool before removing covers or touching internal components.
- Use the correct external power source. Operate the product only from the type of power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service representative or local power company.
- Use only approved power cables. If you have not been provided with a power cable for your appliance or for any AC-powered option intended for your appliance, purchase a power cable that is approved for use in your country. The power cable must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.
- To help prevent electric shock, plug the server and power cables into properly grounded electrical outlets. These cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable.
- Do not use appliance or voltage converters or kits sold for appliances with your product.
- To help protect the server from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position cables and power cords carefully; route cables and the power cord and plug so that they cannot be stepped on or tripped over. Be sure that nothing rests on the cables or power cord.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local or national wiring rules.

Safety with Equipment

The following guidelines help ensure your safety and protect the equipment. This list does not include potentially hazardous situations, so be alert.

Warning! Read the installation instructions before connecting the system to the power source. **Statement 1004**

- Always disconnect all power cords and interface cables before moving the server.
- Never assume that power is disconnected from a circuit; always check.
- Keep the server chassis area clear and dust-free before and after installation.
- Keep tools and assembly components away from walk areas where you or others could fall over them.
- Do not work alone if potentially hazardous conditions exist.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Do not wear loose clothing that may get caught in the server chassis.
- Wear safety glasses when working under conditions that may be hazardous to your eyes.

Safety with Electricity Warnings

- **Warning!** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. **Statement 1017**
- **Warning!** To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. **Statement 1021**
- **Warning!** Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. **Statement 4**
- **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. **Statement 43**
- **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. **Statement 12**
- **Warning!** Before working on a chassis or working near power supplies, unplug the power cord on AC units. **Statement 246**
- **Warning!** The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. **Statement 1019**
- **Warning!** Installation of the equipment must comply with local and national electrical codes. **Statement 1074**
- **Warning!** Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. **Statement 1075**
- **Warning!** Do not work on the system or connect or disconnect cables during periods of lightning activity. **Statement 1001**
- **Warning!** This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. **Statement 39**
- **Warning!** When installing or replacing the unit, the ground connection must always be made first and disconnected last. **Statement 1046**
- Follow these guidelines when working on equipment powered by electricity:
 - Locate the room's emergency power-off switch. Then, if an electrical accident occurs, you can quickly turn off the power.
 - Disconnect all power before doing the following:
 - Working on or near power supplies
 - Installing or removing an appliance
 - Performing most hardware upgrades
- Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.

- Never assume that power is disconnected from a circuit; always check.
- Never perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Never work alone when potentially hazardous conditions exist.
- If an electrical accident occurs, proceed as follows:
 - Use caution, and do not become a victim yourself.
 - Turn off power to the appliance.
 - If possible, send another person to get medical aid. Otherwise, determine the condition of the victim, and then call for help.
 - Determine whether the person needs rescue breathing, external cardiac compressions, or other medical attention; then take appropriate action.
- In addition, use the following guidelines when working with any equipment that is disconnected from a power source but still connected to telephone wiring or network cabling:
 - Never install telephone wiring during a lightning storm.
 - Never install telephone jacks in wet locations unless the jack is specifically designed for it.
 - Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
 - Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD can occur when electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD-prevention procedures when removing and replacing components:

- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the antistatic packing material until you are ready to install the component in your appliance. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.
- Ensure that the SV Director Server is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Attach the antistatic wrist strap to your wrist and connect its cord to the ESD socket on the top, left-hand side on the front of the appliance to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching a metal part of the appliance.

Note: For the safety of your equipment, periodically check the resistance value of the antistatic wrist strap. It should be between 1 and 10 Mohm.

Lifting Guidelines

The SV Director Server weighs between 30 lb (13.6 kg) and 51.5 lb (23.4 kg) depending on what hardware options are installed in the server. The server is not intended to be moved frequently. Before you install the server, ensure that your site is properly prepared so you can avoid having to move the server later to accommodate power sources and network connections.

Whenever you lift the server or any heavy object, follow these guidelines:

- Always disconnect all external cables before lifting or moving the server.
- Ensure that your footing is solid, and balance the weight of the object between your feet.
- Lift the server slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the server, bend at the knees, not at the waist, to reduce the strain on your lower back muscles.
- Lift the server from the bottom and grasp the underside of the server exterior with both hands.

Site Preparation

Warning! This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. **Statement 1017**

Typically, you should have prepared the installation site beforehand. As part of your preparation, obtain a floor plan of the site and the equipment rack where the SV Director Server will be housed. Determine the location of any existing appliances and their interconnections, including communications and power. Following the airflow guidelines to ensure that adequate cooling air is provided to the server. See [Airflow Guidelines](#).

All personnel involved in the installation of the server including installers, engineers, and supervisors should participate in the preparation of a MOP for approval by the customer. See [Method of Procedure](#).

The following sections provide the site preparation requirements that you must consider before installing the server:

- [Rack Mounting](#)
- [Site Environment](#)
- [Airflow Guidelines](#)
- [Temperature and Humidity Guidelines](#)
- [Power Considerations](#)
- [Method of Procedure](#)

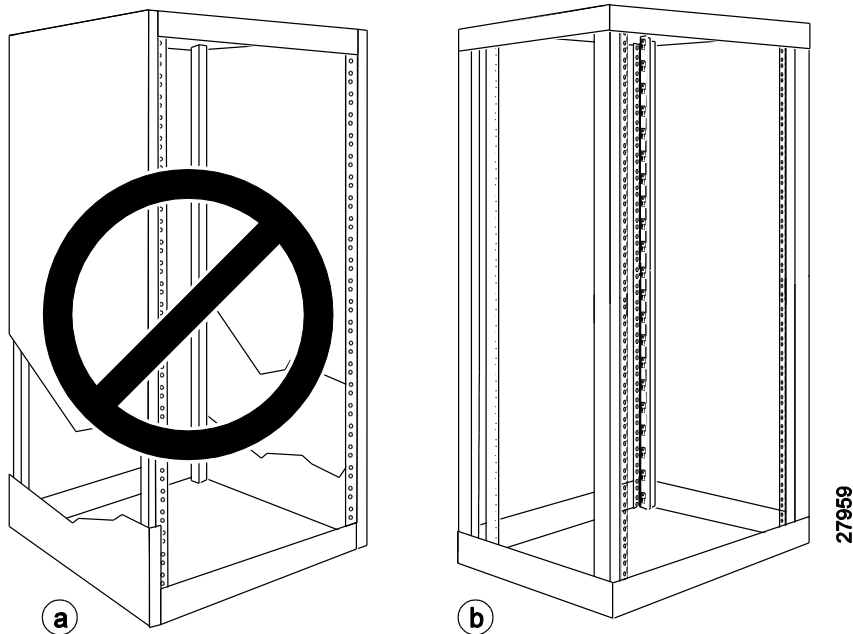
Rack Mounting

The SV Director Server should be installed in a 4-post equipment rack that complies with the Electronics Industries Association (EIA) standard for equipment racks (EIA-310-D). Figure 13 shows a free-standing, 4-post open rack

with two mounting posts in front and two mounting posts in back. The mounting posts in this type of rack are often adjustable so that you can position the rack-mounted unit within the depth of the rack rather than flush-mount it with the front of the rack. The rack-mounting hardware included with the SV Director Server is suitable for most 19-inch equipment racks or telco-type frames.

Figure 13 shows an example of a 4-post (telco-type) equipment rack.

Figure 13. 4-Post Equipment Rack



Caution! Do not use an enclosed rack. Figure 13 (a) shows a free-standing, enclosed rack with two mounting posts in the front. The SV Director Server should not be installed in this type of enclosed rack, because it requires an unobstructed flow of cooling air to maintain acceptable operating temperatures for its internal components. Installing the server in any type of enclosed rack—even with the front and back doors removed—could disrupt the airflow, trap heat next to the server, and cause an over-temperature condition inside the server.

Rack Mounting Specifications

You can mid-mount the unit in a 19-inch (48.3-cm) equipment rack that conforms to the 4-post rack specification (the inside width of the rack should be 17.5 inches [44.45 cm]). When installed in the rack, the unit requires two EIA 3.5-inch (8.9-cm) vertical mounting spaces or 2 rack units (RU) for mounting.

Caution! Clearance in the front and rear of the SV Director Server must be allowed for cooling air to be drawn in through the front and circulated through the appliance and out the rear of the appliance.

The [Rack Mounting Safety Guidelines](#) and the following information will help you plan your equipment rack configuration:

- When mounting the unit to an equipment rack, ensure that the rack is bolted to the floor.
- Because you will probably be installing more than one unit into the rack, ensure that the weight of all the units installed does not make the rack unstable.

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. Statement 1006

Caution! Some equipment racks are also secured to ceiling brackets, if necessary, due to the weight of the equipment in the rack. Make sure that the rack you are using to install the device is secured to the building structure.

- As mentioned in [Airflow Guidelines](#), maintain a 6-inch (15.2-cm) clearance at the front and rear of the unit to ensure adequate air intake and exhaust.
- Avoid installing the unit in an overly congested rack. Air flowing to or from other devices in the rack might interfere with the normal flow of cooling air through the devices, increasing the potential for over-temperature conditions within the devices. See [Over-temperature Protection \(OTP\)](#).
- Allow at least 24 inches (61 cm) of clearance at the front and rear of the rack for server maintenance.

Caution! To prevent the unit from over-heating, never install the server in an enclosed rack or room that is not properly ventilated or air conditioned.

- Follow your local practices for [cable management](#). Ensure that cables to and from the appliances do not impede access to perform equipment maintenance or upgrades.

Rack Mounting Safety Guidelines

Before installing your server in a rack, review the following guidelines:

- Two or more people are required to install the unit in a rack.
- Ensure that the room air temperature is below 95°F (35°C).
- Do not block any air vents; usually 6 inches (15 cm) of space provides proper airflow.
- Plan the device installation starting from the bottom of the rack.
- Install the heaviest device in the bottom of the rack.
- Do not extend more than one device out of the rack at the same time.
- Remove the rack doors and side panels to provide easier access during installation.
- Connect the server to a properly grounded outlet.
- Do not overload the power outlet when installing multiple devices in the rack.

- Do not place any object on top of rack-mounted devices.

Site Environment

The location of your server and the layout of your equipment rack or wiring room are important considerations for proper operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to the server front and rear panels.

The following precautions will help you plan an acceptable operating environment for your server and will help you avoid environmentally caused equipment failures:

- Ensure that the room where your server operates has adequate circulation. Electrical equipment generates heat. Without adequate circulation, ambient air temperature may not cool equipment to acceptable operating temperatures. See [Airflow Guidelines](#).
- Ensure the site of the rack includes provisions for source AC power, grounding, and network cables.
- Allow sufficient space to work around the rack during the installation. You need:
 - a) At least 3 feet (9.14 m) adjacent to the rack to move, align, and insert the serv.
 - b) At least 24 inches (61 cm) of clearance in front of and behind the server for maintenance after installation.
- To mount the server between two posts or rails, the usable aperture (the width between the inner edges of the two mounting flanges) must be at least 17.7 inches (45.0 cm).
- Use appropriate strain-relief methods to protect cables and equipment connections.
- To avoid noise interference in network interface cables, do not route them directly across or along power cables.
- Always follow ESD-prevention procedures as described in [Preventing Electrostatic Discharge Damage](#) to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Airflow Guidelines

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. **Statement 1029**

To ensure adequate airflow through the equipment rack, it is recommended that you maintain a clearance of at least 6 inches (15.24 cm) at the front and the rear of the rack.

If airflow through the equipment rack and the devices that occupy it is blocked or restricted, or if the ambient air drawn into the rack is too warm, an over-temperature condition within the rack and the devices that occupy it can occur.

The site should also be as dust-free as possible. Dust tends to clog the server fans, reducing the flow of cooling air through the equipment rack and the devices that occupy it. This reduction increases the risk of an over-temperature condition.

Additionally, the following guidelines will help you plan your equipment rack configuration:

- Besides airflow, you must allow clearance around the rack for maintenance.
- When mounting a device in an open rack, ensure that the rack frame does not block the front intakes or the rear exhausts.

Temperature and Humidity Guidelines

Table 9 lists the operating and non-operating environmental site requirements for the SV Director Server. The server normally operates within the ranges listed; however, if a temperature measurement approaching a minimum or maximum parameter indicates a potential problem. Maintain normal operation by anticipating and correcting environmental anomalies before they approach critical values by properly planning and preparing your site before you install the server.

Warning! To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 95°F (35°C).
Statement 1047

Table 9. Operating and Nonoperating Environmental Specifications

Specification	Minimum	Maximum
Temperature, ambient operating	50°F (10°C)	95°F (35°C)
Temperature, ambient nonoperating and storage	-40°F (°C)	158°F (70°C)
Humidity, ambient (noncondensing) operating	5%	85%
Humidity, ambient (noncondensing) nonoperating and storage	50%	90%
Vibration, operating	5–500 Hz, 2.20 g RMS random	—

Power Considerations

For redundancy, you need to configure the SV Director Server with two AC-input power supplies. For power supply pinout descriptions, see the [AC Power Supplies](#). The AC power supplies are hot-swappable.

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. **Statement 1029**

By installing two power supply modules on the SV Director Server, the hot-swap feature allows you to replace a failed power supply without interrupting the appliance operation. During this hot-swap replacement, a maximum of two minutes is recommended.

Warning! Never install an AC power module and a DC power module in the same chassis. **Statement 1050**

AC Power Supply Safety Considerations

Ensure all power connections conform to the rules and regulations in the National Electrical Codes (NECs), as well as local codes. Follow these precautions and recommendations when planning power connections to your appliance:

- Check the power at your site before installation and periodically after installation to ensure that you are receiving clean power (free of spikes and noise). Install a power conditioner if necessary.
- The AC power supply includes the following features:
 - Auto selects either 110-V or 220-V operation.
 - All units include an electrical cord. (A label near the power cord indicates the correct voltage, frequency, current draw, and power dissipation for the appliance.)

Warning! This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). **Statement 13**

Install proper grounding to your server and host equipment rack to avoid damage from lightning and power surges.

Warning! This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. **Statement 1024**

The AC-input power supply operates on input voltage and frequency within the ranges of 100 to 240 VRMS and 50/60 Hz without the need for operator adjustments.

Cable Management

Cable management is the most visual aspect of your server setup. However, cable management is often overlooked because it can be time consuming.

Equipment racks and enclosures house more equipment today than ever before. This growth has increased the need for organized cable management both inside and outside the rack. Poor cable management not only leads to damaged cables or increased time for adding or changing out cables, but also blocks critical airflow or access. These problems can lead to inefficiencies in the performance of your equipment or even downtime.

There are many solutions to address cable management. They can range from simple cable management rings, to cable management brackets, to vertical or horizontal organizers, to troughs and ladders.

All SV Director Server cables should be properly dressed so as not to interfere with each other or other pieces of equipment. Use local practices to ensure that the cables attached to your appliance are properly dressed.

Method of Procedure

As described previously, part of your preparation includes reviewing installation plans or MOPs. An example of a MOP (a pre-installation checklist of tasks and considerations that need to be addressed and agreed upon before proceeding with the installation) is as follows:

1. Assign personnel.
2. Determine protection requirements for personnel, equipment, and tools.
3. Evaluate potential hazards that may affect service.
4. Schedule time for installation.
5. Determine any space requirements.
6. Determine any power requirements.
7. Identify any required procedures or tests.
8. On an equipment plan, make a preliminary decision that locates each SV Director Server that you plan to install.
9. Read this hardware installation guide.
10. Verify the list of replaceable parts for installation (screws, bolts, washers, and so on) so that the parts are identified.
11. Check the required tools list to make sure the necessary tools and test equipment are available. See Required Tools and Equipment.
12. Perform the installation.

Unpacking and Checking the Contents of Your Shipment

The shipping package for the SV Director Server is designed to reduce the possibility of product damage associated with routine material handling experienced during shipment. To reduce the potential damage to the product, transport the unit in its original Cisco packaging. Failure to do so may result in damage to the unit. Also, do not remove the unit from its shipping container until you are ready to install it.

The server, cables, and any optional equipment you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all the parts listed in Table 10. A “Notes” section has been provided to record damaged or missing items.

Do not discard the packaging materials used in shipping your SV Director Server. You will need the packaging materials in the future if you move or ship your server.

Table 10. Cisco SV Director Server Packing List

Item	Cisco Part Number
Cisco ADE 2140 Series Appliance	CADE-2140-K9
4-post Sliding Rail Rack-Mount Kit for ADE 2130/2140	CADE-2U-RAILS
1 additional AC Power Supply for ADE 2130/2140	CADE-2U-AC-PSU
1 additional Power Cord, US	CAB-AC
Additional 2 GB RAM (for Cisco ADE 2130/2140)	CADE-RAM-25EF
147 GB SAS HDD (for Cisco ADE 2130/2140)	CADE-HDD-A2100147=
Cisco Information Packet	78-5235-03D0
Cisco 90-Day Limited Hardware Warranty Terms	78-5236-01C0
Regulatory Compliance and Safety Information for the Cisco Application Deployment Engine (ADE) 2130 and 2140 Series Appliance	78-18319-xx

Inspect all items for shipping damage. If anything appears to be damaged, or if you encounter problems installing or configuring your appliance, contact your customer service representative.

Cisco Information Packet and Warranty

The Cisco Information Packet provides warranty, service, and support information.

To access and download the Cisco Information Packet and your warranty and license agreements from Cisco.com:

1. Launch your Internet browser, then go to this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/cetrans.htm

The Warranties and License Agreements page appears.

2. To read the Cisco Information Packet:

- a. Click the Information Packet Number field, and make sure the part number 78-5235-03D0 is highlighted.
- b. Select the language in which you would like to read the document.
- c. Click **Go**. The Cisco Limited Warranty and software License page from the Information Packet appears.
- d. Read the document online, or click the PDF icon to download and print the document.

Note: You must have Adobe Acrobat Reader to view and print PDF files. You can download the reader from the Adobe website at: <http://www.adobe.com>.

3. To read translated and localized warranty information about your product:

- a. Enter this part number in the Warranty Document Number field:

78-5236-01C0

- b. Select the language in which you would like to read the document.
- c. Click **Go**. The Cisco warranty page appears.
- d. Review the document online, or click the PDF icon to download and print the document in PDF.

Duration of Hardware Warranty

Ninety (90) days.

Required Tools and Equipment

Caution! The fastener pack, within the rack-mount kit, contains eight rack screws. You must check these screws to ensure that they are the appropriate size for the holes in your rack. Using the wrong-sized screws for your threaded rack holes can damage the rack.

You need the following tools and equipment to install the SV Director Server in a 4-post rack:

Warning! Only trained and qualified personnel should be allowed to install, replace, or service this equipment. **Statement 1030**

- ESD-preventive cord and wrist strap.
- Number 2 Phillips screwdriver.
- Flat-blade screwdrivers: small, 3/16-inch (0.476 cm) and medium, 1/4-inch (0.625 cm) to remove the cover, if you are upgrading memory or other components.
- 4-Post Rack-Mount Hardware Kit (included)
- Cables for connection to the LAN ports (depending on the configuration).
- Ethernet hub or PC with a network interface card for connection to the Ethernet (LAN) port or ports.
- Console terminal (an ASCII terminal or a PC running terminal-emulation software) that is configured for 9600 baud, 8 data bits, no parity, 1 stop bit, and no hardware flow control.
- Console cable for connection to the serial (console) port.

Installation Checklist

To assist you with your installation and to provide a historical record of what was done, and by whom, use the following Installation Checklist. Make a copy of this checklist and mark the entries as you complete each task.

Site Name:

Cisco SV Director Server Name:

Task	Verified by	Date
Installation Checklist copied		
Background information placed in Site Log		
Site power voltages verified		
Installation site power check completed		
Required tools available		
Additional equipment available		
Cisco ADE 2140 Series appliance received		
Cisco Information Packet publication received		
Appliance components verified		
Initial electrical connections established		
ASCII terminal (for local configuration)		
Signal distance limits verified		
Startup sequence steps completed		
Initial operation verified		
Notes:		

Chapter 3 Installation

To achieve system redundancy for the SV Director Server, the hardware requirements are as follows:

- Dual Power Supply Units (PSUs)
- Dual CPU 2.33 GHz
- Dual 2 GB RAM (total of 4 GB)
- Dual 147 GB hard disk drive (configured as RAID-1)

To install the SV Director Server, you will need to do the following:

1. [Install additional RAM](#)
2. [Install an Additional Disk Drive](#)
3. [Install the Second Power Supply Unit](#)
4. [Connect the Ethernet Cable](#)

Removing the Chassis Cover

Warning! Before performing any of the following procedures, ensure that power is removed from the DC circuit. **Statement 1003**

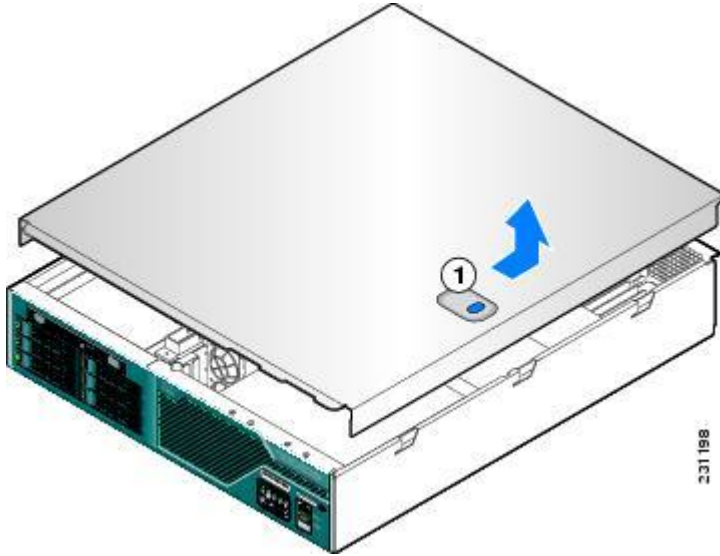
Warning! Before working on a chassis or working near power supplies, unplug the power cord on AC units. **Statement 246**

Note: A nonskid surface or a stop behind the appliance may be needed to prevent the unit from sliding on your work surface.

To remove the cover:

1. Review the [Safety Precautions](#).
2. If already powered on, power down the unit and all external devices.
Disconnect the AC power cord or DC power source and all external cables.
3. Attach the antistatic wrist strap to your wrist and connect its cord to the ESD socket on the top, left-hand side on the front of the appliance.
4. Remove the shipping screw, if present.
5. While pushing in and holding the blue button at the top of the chassis (see location 1 in Figure 14), slide the top cover back until it stops.

Figure 14. Removing the Chassis Cover



6. Lift the cover straight up to remove it from the unit. The interior of the chassis resembles Figure 15.

Figure 15. Cisco ADE 2140 with Cover Removed



Warning! The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed. **Statement 1077**

Caution! For proper cooling and airflow, replace the cover before turning on the unit. Operating the unit for extended periods (over 30 minutes) with the cover removed might damage the internal components.

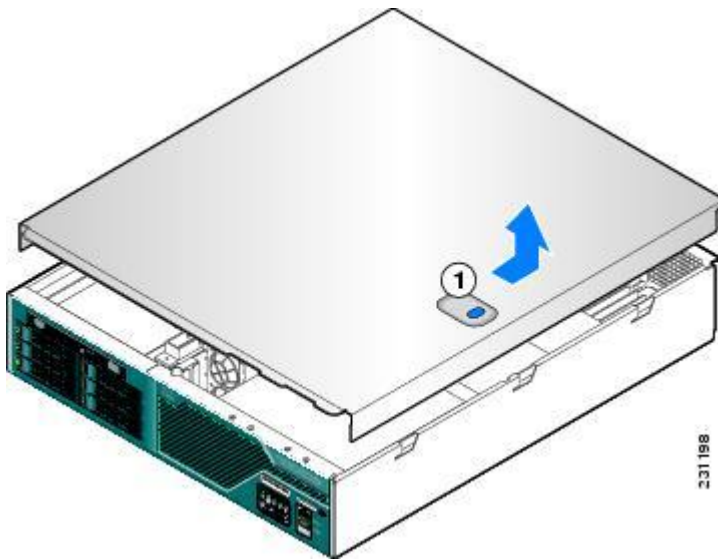
Installing the Cover

To install the chassis cover after you have completed your hardware options installation or maintenance:

1. Review the information in [Safety Precautions](#).
2. Place the cover over the chassis so that the side edges of the cover sit just inside the sidewalls. (See location 1 in Figure 4-11.)

3. At the front of the cover, you should see a small gap (approximately 1/8-inch [3-mm]) between the chassis cover and the front of the appliance.

Figure 16. Installing the Cisco ADE 2140 Series Appliance Cover



4. Press down slightly on the cover behind the edge and slide the cover forward until it click into place.
5. Reconnect all external cables and the AC power cord.

Removing the Front Bezel

Note: The following procedures assume your Cisco ADE 2140 Series appliance came shipped with the front bezel installed.

Remove the front bezel to:

- Install or remove hard drives or the optional DVD-ROM drive
- Access the front-panel serial (console) port and USB ports
- Observe the individual hard disk drive (HDD) activity and fault LEDs

Note: The appliance does not need to be powered down to remove the front bezel.

To remove the front bezel:

1. Unfasten the bezel retention screw on the right side of the chassis with a Number 2 Phillips screwdriver.
2. Rotate the bezel outward and detach.

To install the front bezel:

1. Align the four tabs on the left of the bezel with the slots in the front panel and then rotate the free end of the bezel to the closed position.
2. Snap the front bezel into place and tighten the screw at the right side of the bezel.

Removing the Processor Air Duct

The air duct must be removed to access the processors and the DIMMs.

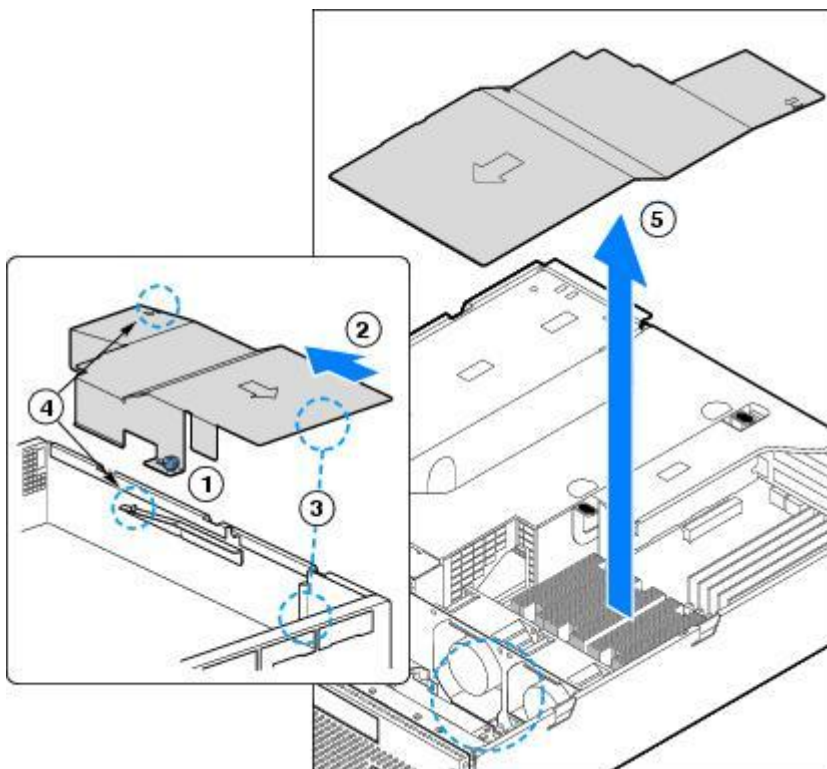
Caution! The processor air duct is required for proper airflow within the chassis. Be sure the air duct is in place again before installing the chassis cover.

To remove the processor air duct:

1. Review the [Safety Precautions](#).
2. Power down the unit and all external devices. Disconnect the AC power cord or DC power source and all external cables.
3. Attach the antistatic wrist strap to your wrist and connect its cord to the ESD socket on the top, left-hand side on the front of the chassis.
4. Remove the chassis cover. For instructions, see [Removing the Chassis Cover](#).
5. Slide the duct a few inches (millimeters) toward the rear of the chassis until it stops. (See location 2 in Figure 17).

The front edge will disengage from the front panel. (See location 3 in Figure 17). The metal tab at the rear will release. (See location 4 in Figure 17).

Figure 17. Removing the Processor Air Duct



1	Captive fastener
2	Slide air duct towards rear
3	Front edge
4	Metal tab
5	Lift air duct up

6. Loosen the captive fastener. (See label 1 in Figure 17.)
7. Lift the air duct straight up and remove it from the chassis. (See label 5 in Figure 17.)

The chassis with the air duct removed resembles Figure 18.

Figure 18. Cisco ADE 2140 with Air Duct Removed



Replacing the Air Duct

To replace the air duct:

1. Slide the duct forward until it is flush with the front of the chassis and stops.
2. The front edge will engage at the front panel. (See label 3 in Figure 17.) The metal tab at the rear will engage. (See label 4 in Figure 17.)
3. Push the air duct down into the chassis.
4. Tighten the captive fastener. (See label 1 in Figure 17.)
5. Replace the chassis cover.

Installing Additional RAM

The Cisco ADE 2140 Series appliance comes with 2 GB of RAM. The recommended configuration for the SV Director Server is 4 GB. Therefore, you need to install an additional DIMM.

Warning! This process assumes a new installation. Before installing any components, ensure that the device is powered down. Also, attach the antistatic wrist strap to your wrist and connect its cord to the ESD socket on the top, left-hand side on the front of the chassis.

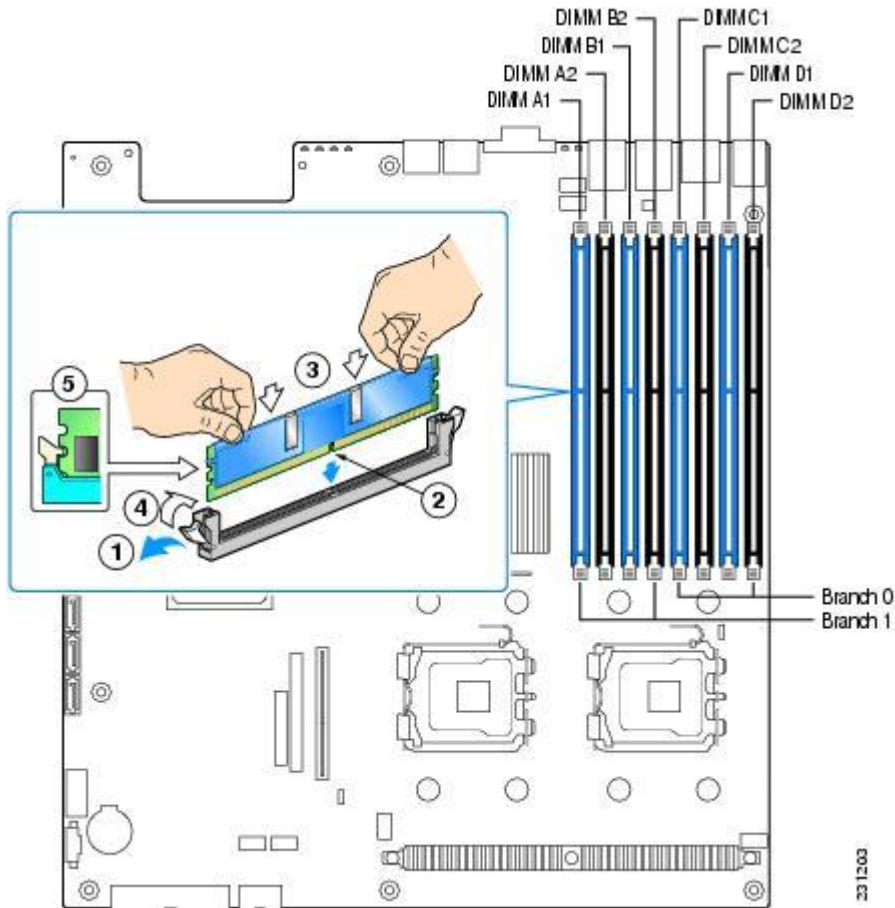
The memory is not hot-swappable. Before removing or replacing any dual in-line memory module (DIMM), you must first take the unit out of service by turning off the power button and unplugging the AC power cord from the unit or wall outlet.

Caution! When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For more information on handling these devices, see [Preventing Electrostatic Discharge Damage](#).

To install an additional DIMM:

1. [Remove the Chassis Cover.](#)
2. [Remove the Processor Air Duct.](#)
3. Remove the shipping screw, if present.
4. Locate the DIMM slots. (See Figure 19).

Figure 19. Cisco ADE 2140 DIMM slots



1	Ejector tab (open)
2	DIMM notch
3	DIMM top connector edge
4	Ejector tab (closed)
5	DIMM outside connector edge

5. Make sure the ejector tabs at both ends of the DIMM slots are pushed outward to the sides (open position). (See label 1 in Figure 19.)
6. Holding the DIMM by the top edges, remove it from its anti-static package.

Caution! Do not touch the DIMM connectors. Handle the DIMM by the edges only.

7. Position the DIMM above the slot. Align the notch on the bottom edge of the DIMM with the key in the DIMM slot. (See label 2 in Figure 19.)
8. Insert the bottom edge of the DIMM into the slot. (See label 3 in Figure 19.)
9. When the DIMM is correctly positioned, push down *firmly* on the top edge of the DIMM until the ejector tabs snap into place. (See label 4 in Figure 19.)
10. [Replace the air duct.](#)

Installing an Additional Disk Drive

The Cisco ADE 2140 Series appliance comes with one hard disk drive installed. The recommended configuration for the SV Director Server is two 147 GB hard drives. Therefore, you will need to install an additional disk drive.

Up to six drives can be installed. The hard drive bay is at the left side of the chassis, underneath the DVD-ROM drive. The hard drive trays in the drive bay are labeled 1, 3, and 5 on the left side of the bay and 0, 2, and 4 on the right side of the bay. The drives need to be installed in a specific order; that is, drive 0 must be installed before drive 1, drive 1 before drive 2, and so on.

Caution! If you install fewer than six hard drives, the empty bays must have drive trays with baffles in them to maintain proper appliance cooling.

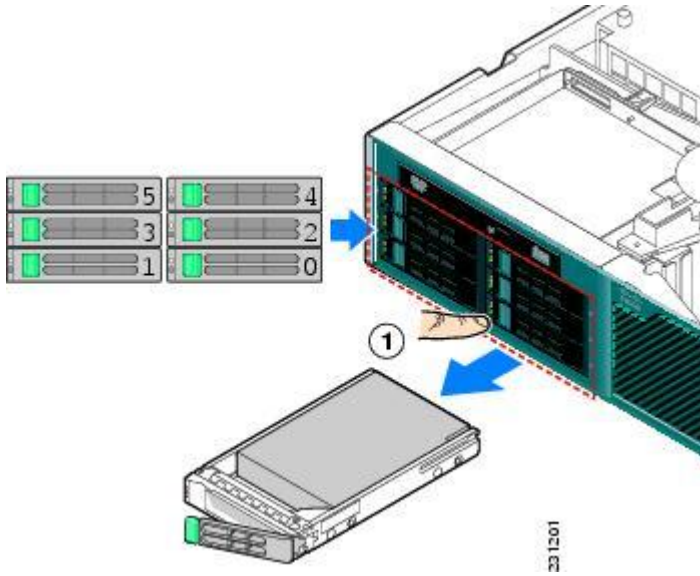
To install a hard drive into the appliance:

1. Inspect the new drive for any signs of damage.
2. Review the information in [Safety Precautions](#).
3. Power down the appliance and all external devices. Disconnect the AC power cord and all external cables.
4. Attach the antistatic wrist strap to your wrist and connect its cord to the ESD socket on the top, left-hand side on the front of the chassis.
5. Select the drive bay where you want to install the drive.

Note: If fewer than six drives are installed, drive bay 0 must be used first, then drive bay 1, and so forth. The drive tray numbers are shown in Figure 20.

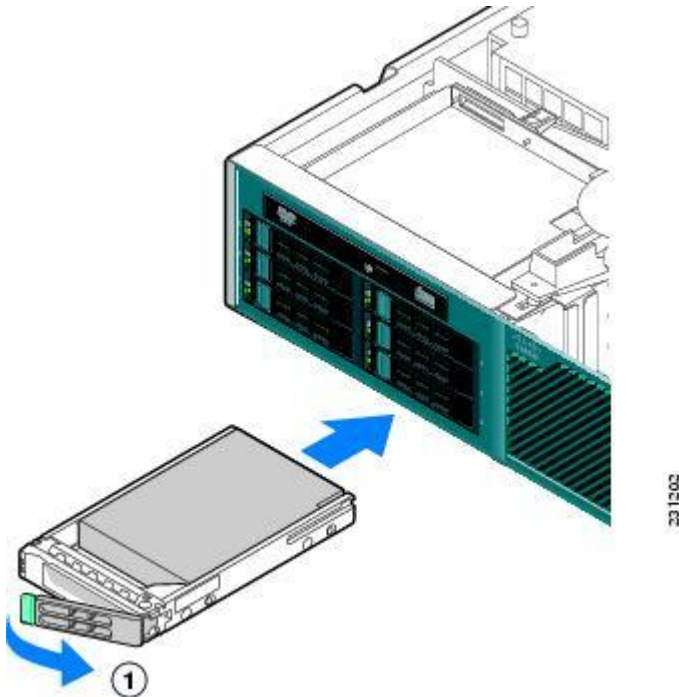
6. Remove the drive tray by pressing the blue button to open the lever and pull the tray out. (See label 1 in Figure 20.)

Figure 20. Removing the Hard Drive Tray



7. Install the new drive in the drive tray and secure the drive with the four screws with a Number 2 Phillips screwdriver.
8. To reinstall the drive tray, with the drive tray locking lever open, push the drive tray into the drive bay until it stops. (See label 1 in Figure 21.)

Figure 21. Installing the Hard Drive Tray



9. Press the lever until it snaps shut to secure the drive into the drive bay.

Installing the Second AC Power Supply Unit

For redundancy, the SV Director Server requires two AC power supplies, enabling one to become a backup for the other in case of failure. Redundant power supplies also enable you to “hot-swap” a power supply if you need to replace it. In other words, you can replace a power supply while the appliance is running. To maintain hot-swap capability, make sure that there is an active power supply in both appliance slots before replacing (hot-swapping) a power supply.

The AC power supplies are accessible from the rear panel. When you unpack the Cisco ADE 2140 Series appliance, only one space in the power supply module is occupied. The empty space is occupied with a blank filler panel.

Both power supplies for the SV Director Server must be AC.

Warning! Never install an AC power module and a DC power module in the same chassis. **Statement 1050**

Figure 22. Cisco ADE-2140 Server – Rear View with One PSU

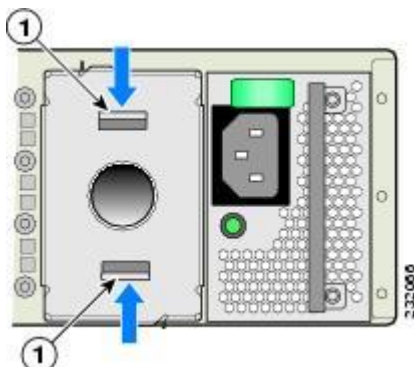


Caution! Before replacing an existing power supply, you must first take the server out of service. To do so, turn off all external devices connected to the server, turn off the power button on the server, and unplug the AC power cord.

To install the second power supply unit:

1. Notice there is a single power supply on the far right of the box and a “filler” unit immediately to its left.
2. Remove the blank filler panel from the rear panel by pressing the two release tabs (1) toward each other, as illustrated in Figure 23.

Figure 23. Blank Filler Panel and AC Power Module



3. Pull the blank filler panel from the chassis.
4. Slide the new power supply into the chassis until it clicks into place. The unit should now resemble Figure 24.
5. Save the blank filler panel, in case you need to use it at a later date.

Figure 24. Cisco ADE-2140 Server – Rear View with Two AC PSUs

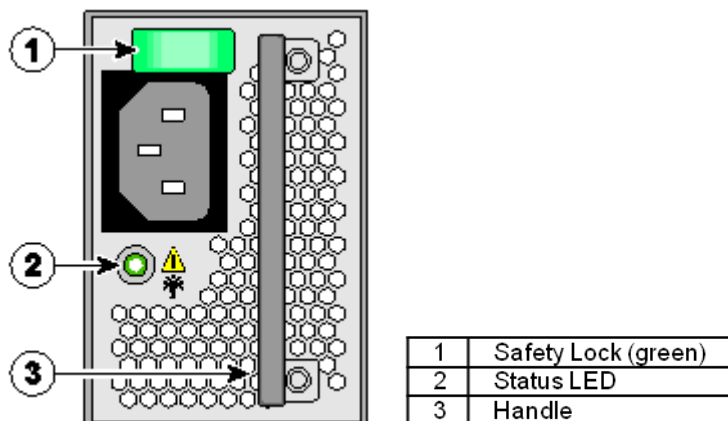


Replacing a Redundant Power Supply

To replace a redundant power supply:

1. Check the status LED on the power supplies (see location 2 in Figure 25) to determine which power supply has failed.
2. Disconnect the appropriate AC power source.

Figure 25. AC Power Supply Module LEDs



3. Press and hold the green safety lock (see location 1 in Figure 25) downward to disengage the power supply.
4. Grasp the handle (see location 3 in Figure 25) and pull the power supply from the chassis.
5. Slide the new power supply into the chassis until it clicks into place.

Verify Power and Internet Connections

Prior to mounting the server chassis in a rack:

1. [Connect the AC power supplies to power.](#)

2. [Connect the Network Cable.](#)
3. [Power up the server.](#)
4. Verify the following:
 - The power supplies are operational, indicated by the illumination of the green light below the power cord connector.
 - The server's fan and blower are operating.
 - The adapter cards (if installed) are properly installed in their slots, and each initializes (is enabled by the appliance software) without problems.
 - There is network connectivity to the server.

When each of these conditions is met, proceed to [mount the chassis in a 4-post rack](#). If any of these conditions are not met, refer to [Chapter 4 Troubleshooting](#).

5. Power down the server and remove all cables prior to installing it in the rack.

Mounting the SV Director Server in a 4-Post Rack

To install the SV Director Server in a 4-post rack, follow these steps:

[Step 1: Attach the Inner Slide Rails to the Appliance](#)

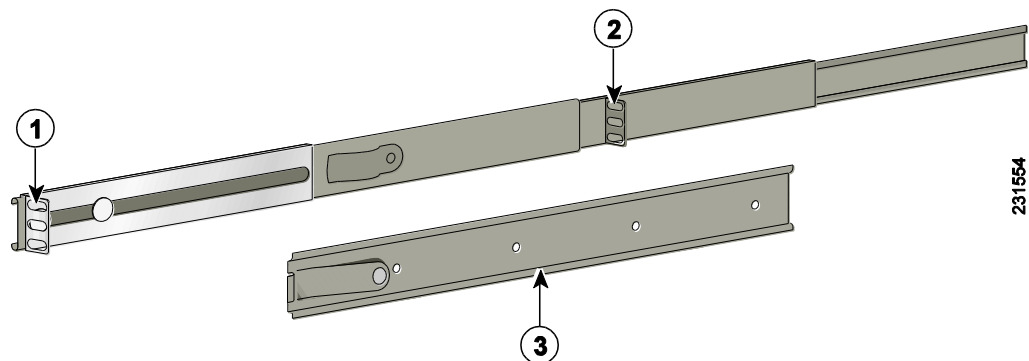
[Step 2: Attach the Outer Slide Rails to the Rack](#)

[Step 3: Install the Appliance into the Rack](#)

Warning! When the unit is installed in a rack and is fully extended on its slide rail, it is possible for the rack to become unstable and tip over, which could cause serious injury. To eliminate the risk of rack instability from extending the rail or in the event of an earthquake, you should affix the rack to the floor.

Figure 26 shows the rails and brackets that you need to install the SV Director Server in a 4-post rack. Figure 27 lists the contents of the 4-Post Rack Mount Hardware Kit that comes with the SV Director Server.

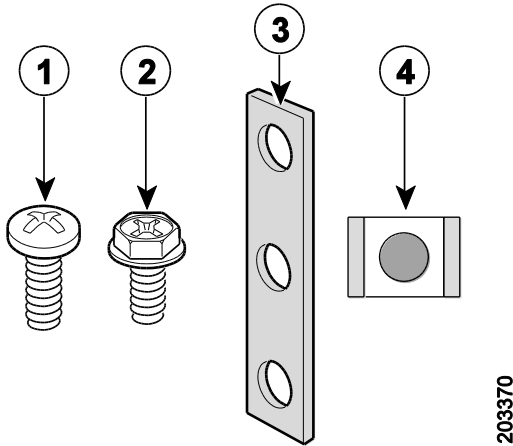
Figure 26. 4-post Rails and Brackets



No.	Description
1	Rear-mounting bracket of outer slide rail
2	Front-mounting bracket of outer slide rail
3	Inner slide rail

231554

Figure 27. 4-Post Rack-Mount Hardware Kit



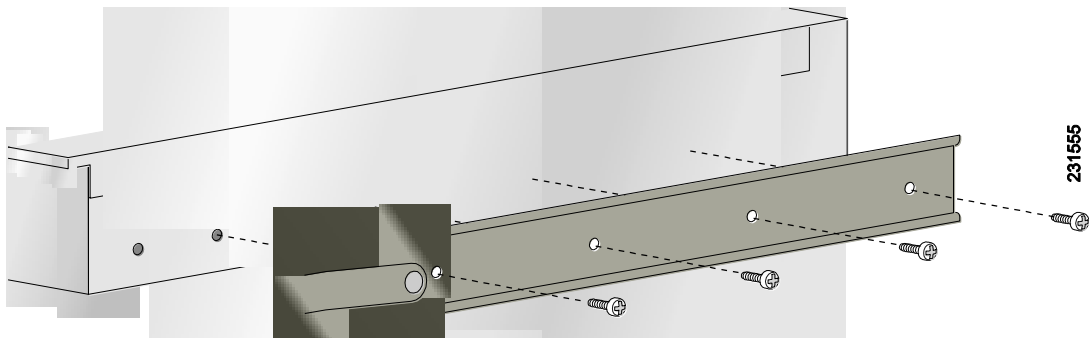
No.	Description	Quantity
1	Rack screw, 10-32 x 1/2-inch (1.27 cm)	12
2	Screw, 8-32 x 3/8-inch (.95 cm)	8
3	Nut Bar. Used in unthreaded round-hole racks or used over the cage nuts for square-hole racks.	4
4	Cage nut 10-32 x 3/8-inch (.95 cm). Used only when mounting in square-hole racks.	12
—	Screw, 6-32 x 1/4-inch (.63 cm). Not shown. Depending on rack type, can be used in place of 8-32 x 3/8 screws.	8

Step 1: Attach the Inner Slide Rails to the Chassis

To attach the slide rails:

1. Align the inner slide rail holes with the horizontal holes on the side of the chassis beginning with the second hole. The release spring on the inner slide rail must point toward the rear of the chassis and face away from the chassis. Refer to Figure 28.

Figure 28. Aligning the Inner Slide Rail with the Mounting Studs



2. Attach the inner slide rail to the chassis with the 8-32 x 3/8-inch screws.
3. Repeat Steps 1 through 2 for the other inner slide rail and chassis bracket.
4. Proceed to the next section to attach the outer slide rails to the rack.

Step 2: Attach the Outer Slide Rails to the Rack

Caution! Lifting the unit and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded SV Director Server weighs approximately 51.5 lb (23.4 kg).

Note: This procedure describes the installation of the outer slide rails to a 4-post threaded-hole rack. If your 4-post rack uses rectangular holes, ensure that you have the proper adapters in place to secure the slide rails to the posts.

To attach the outer slide rails to the rack:

1. Determine the position on the rack where you want to mount the server.
2. Position the rear-mounting bracket on the outer side of the rear rack post and attach with the 10-32 x 1/2-inch rack screws.
3. Align the center end of the outer slide rail to the corresponding hole on the front rack post.
4. Attach the front-mounting bracket of the outer slide rail to the corresponding holes on the front rack post with the 10-32 x 1/2-inch rack screws.
5. Repeat Steps 2 through 4 for the other outer slide rail.
6. Proceed to [Step 3: Install the Server into the Rack](#).

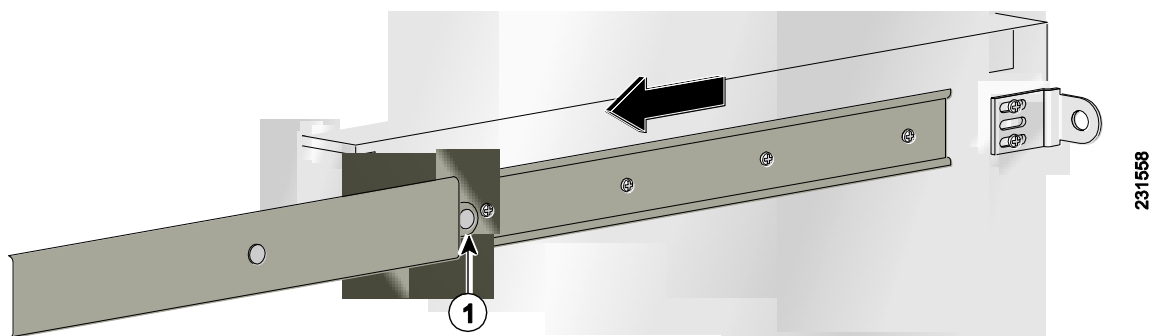
Step 3: Install the Server into the Rack

Caution! If you mount the outer slide rails in holes that are not vertically aligned from front to back, you might damage the slide rails and your mounting might not be secure.

To install the server into the rack:

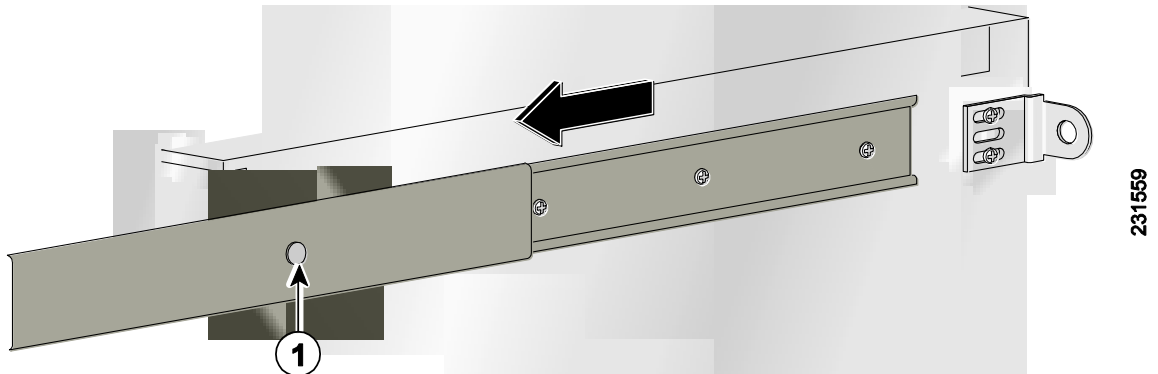
1. Extend the inner slide rail until it locks into place.
2. Position the chassis so that the rear end of the inner slide rail aligns with the front end of the outer slide rails.
3. Slide the chassis into the rack. You may need to press on the release spring. See location 1 in Figure 29.

Figure 29. Installing the Chassis in the Rack



- Slide the chassis until the release spring clicks into place, then push the chassis until the rack-mounting ear meets the front rack posts. See location 1 in Figure 30.

Figure 30. Sliding the Chassis Into the Rack



- (Optional) For extra security, you can attach a third 10-32 x 1/2-inch rack screw from the center of the rack-mounting ear into the front rack post. See location 1 in Figure 31.
- Proceed to [Connecting the AC Power Supplies to Power](#).

Figure 31. Securing the Appliance to the front rack posts



Connecting the AC Power Supplies to Power

Warning! This equipment must be grounded. 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. **Statement 1024**

Warning! This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10 Amps **Statement 1005**

Warning! Before working on a system that has an on/off switch, turn Off the power and unplug the power cord. **Statement 1**

Warning! Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems

without a power switch, line voltages are present within the power supply when the power cord is connected. **Statement 4**

Warning! Never install an AC power module and a DC power module in the same chassis. **Statement 1050**

Warning! This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. **Statement 1028**

Connecting the Server AC Power

When connecting the SV Director Server to power, use the provided AC power cord.

The AC power cord is considered the primary disconnect for the server and must be readily accessible when installed. If the server power cord is not readily accessible for disconnection, you must install an AC power disconnect for the entire rack. This disconnect must be readily accessible, and it must be properly labeled as the controlling power to the entire rack, not just to the server.

Power Connections

To connect the AC power cord to the SV Director Server:

1. Review the information in [Safety Precautions](#).

Warning! This equipment must be grounded. 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. **Statement 1024**

2. Plug the AC power cord into the AC power input connector on the rear panel.
3. Connect the other end of the power cord to a power source at your site.
4. Repeat Steps 2 and 3 to connect the second AC power supply to power.

Caution! Do not power on the unit, yet.

5. Ground the rack.

To avoid the potential for an electrical shock, you must include a third wire safety ground conductor with the rack installation. If the power cord is plugged into an AC outlet that is part of the rack, you must provide proper grounding for the rack itself. If the power cord is plugged into a wall outlet, the safety ground conductor in the power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack.

6. After confirming that all installation steps are complete, [connect the network cable](#) and [console cable](#).

Connecting the Network Cable

By default, the SV Director Server has two Ethernet connectors, identified in Figure 32. Connect only NIC 1 to the network using an RJ-45 connector.

Figure 32. Cisco ADE 2140 Series Appliance Rear View



Warning! Do not work on the system or connect or disconnect cables during periods of lightning activity. **Statement 1001**

The RJ-45 port supports standard straight-through and crossover Category 5 unshielded twisted-pair (UTP) cables. Cisco does supply one Category 5 UTP cable (yellow) with the SV Director Server. If more UTP cables are needed, these cables are available commercially.

To connect the cable to the appliance network interface connector (NIC) port:

1. Connect one end of the cable to the NIC port on the server.
2. Connect the other end to a hub or switch in your network.

Connecting the Console Cable

Warning! Do not work on the system or connect or disconnect cables during periods of lightning activity. **Statement 1001**

You will need to connect a terminal to the SV Director Server console port when you install the SV Director software. Only one serial (console) port can be used at a time because they are shared.

To connect a terminal or a PC running terminal-emulation software to the console port on the SV Director Server:

1. Connect the terminal using a rollover cable (provided) to the console port.
2. Configure your terminal or terminal-emulation software for 9600 baud, 8 data bits, no parity, 1 stop bit, and no hardware flow control.

Powering Up the SV Director Server

Warning! Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. **Statement 4**

Warning! This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. **Statement 39**

To power up the SV Director Server and verify its initialization and self-test, follow this procedure. When the procedure is finished, the appliance is ready to configure.

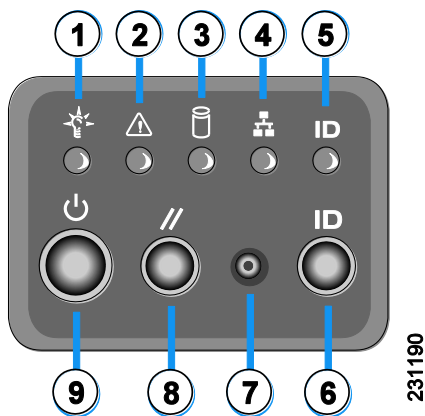
1. Review the [Safety Guidelines](#).
2. Before proceeding, if the AC power cord is connected directly into the AC power outlet and because the AC power cord provides its own ground conductor, you only need to ensure that the rack has been properly grounded. See [Connecting the AC Power Supplies to Power](#).
3. Plug the AC power cord into the power cord receptacle on the rear panel.
4. Connect the other end of the power cord to a power source at your installation site.
5. Repeat steps 3 and 4 for the second AC power supply.
6. Press the power button on the front of the appliance. The server should begin its power-up procedure.
7. After the operating system boots up, observe the front-panel LEDs to verify that your system is operating properly. See [Checking the LEDs](#).

Once the operating system boots, you are ready to install the SV Director software. See the *Cisco StadiumVision Director Installation, Upgrade, Backup and Restore Guide* for details.

Checking the LEDs

When the SV Director Server is up and running, observe the front-panel LEDs as shown in Figure 33.

Figure 33. SV Director Server Front Panel LEDs



LED	Color	State	Description
1	Green	On	Power on.
	Off	Off	Power off.
2	Green	On	Standby or ready for operation.
	Green	Blinking	Degraded operation (for example, power supply non-redundancy, part of system memory mapped out of BIOS).
	Amber	On	One or more critical fault conditions.

	Amber	Blinking	One or more noncritical fault conditions.
3	Green	On	Hard disk drive activity. This is an aggregated indication for all hard disk drives. Each hard disk drive contains its own activity and fault LEDs.
	Amber	On	Hard disk drive fault. This is an aggregated indication for all hard disk drives. Each hard disk drive contains its own activity and fault LEDs.
4	Green	On	NIC activity.
5	Blue		System identity. LED can be toggled remotely or by the front-panel ID switch to obtain the system's identity.
6	Switch		Toggles appliance ID LED
7	Switch		Asserts the NMI (non-maskable interrupt) to the processor on the appliance. When pressed, clears the processor allowing the processor to continue to execute the software normally.
8	Switch		Resets the appliance.
9	Switch		Toggles the appliance power

The following LEDs provide power, activity, and status information:

- Appliance power, green:
 - On when power is on.
 - Off when power is off or an error condition has been detected in the operating voltages.
- Hard disk activity, green:
 - On when appliance software has booted up, and the appliance is operational.
 - Off when appliance has not yet booted, or an error condition has been detected in the boot process.
- NIC 1 or NIC 2, green:
 - On when packets are transferring
 - Off when no packets are transferring

Chapter 4 Troubleshooting

The Cisco ADE 2140 Series appliance undergoes extensive testing before it leaves the factory. If you encounter problems, use the information in this chapter to help isolate problems or to eliminate the appliance as the source of the problem.

The procedures in this chapter assume that you are troubleshooting the initial Cisco ADE 2140 Series appliance startup, and that the appliance is in the original factory configuration. If you have removed or replaced components or changed any default settings, the recommendations in this chapter might not apply.

This chapter does not cover every possible trouble event that might occur on an appliance but instead focuses on those events that are frequently seen by the customer.

Troubleshooting Overview

Before and at initial system boot, you should verify the following:

- External power cable is connected, and the proper power source is being applied.
- The appliance fan and blower are operating.
- The appliance software boots successfully.
- The adapter cards (if installed) are properly installed in their slots, and each initializes (is enabled by the appliance software) without problems.

When each of these conditions is met, the hardware installation is complete, and you should proceed to install the SV Director software on the server.

If you cannot locate the source of the problem, contact a customer service representative for information on how to proceed. For technical support information, see the *Cisco Information Packet* publication that shipped with your appliance. Before you call, have the following information ready:

- Appliance chassis type and serial number.
- Maintenance agreement or warranty information (see the *Cisco Information Packet*).
- Type of software and version number (if applicable).
- Date you received the new appliance.
- Brief description of the problem you are having and the steps you have taken to isolate and resolve the problem

Ensure you provide the customer service representative with any upgrade or maintenance information that was performed on the Cisco ADE 2140 Series appliance after your initial installation.

Problem Solving

The key to problem solving is to isolate the problem to a specific location by comparing what the SV Director Server is doing to what it should be doing.

In other words, when troubleshooting, define the specific symptoms, identify all potential problems that could be causing the symptoms, and then systematically eliminate each potential problem (from most likely to least likely) until the symptoms disappear.

The following steps provide guidelines to use in the problem-solving process:

1. Analyze the problem and create a clear problem statement. Define symptoms and potential causes.
2. Gather the facts that you need to help isolate possible causes.
3. Consider possible causes based on the facts that you gathered.
4. Create an action plan based on those causes. Begin with the most likely problem and devise a plan in which you manipulate only one variable.
5. Implement the action plan. Perform each step carefully while testing to see whether the symptom disappears.
6. Analyze the results to determine whether the problem has been resolved. If the problem was resolved, consider the process complete.
7. If the problem has not been resolved, create an action plan based on the next most probable cause on your list. Return to Step 4 and repeat the process until the problem is solved.
8. Make sure that you undo anything that you changed while implementing your action plan. Remember that you want to change only one variable at a time.

Note: The LEDs on the front panel of the appliance enable you to determine appliance performance and operation. For a description of these LEDs, see Figure 34.

When problem solving, check the following subsystems first:

- Power and cooling systems—External power source, AC power cable or DC power wires, and appliance fans. Also check for inadequate ventilation, air circulation, or environmental conditions.
- Adapter cards—Checking the LEDs on the adapter card can help you to identify a failure.
- Cables—Ensure that the external cables connecting the appliance to the network are all secure.

Troubleshooting the Power and Cooling Systems

Both the power LED and the fans can help you troubleshoot a power problem. Check the following items to help isolate the problem:

- When the SV Director Server is connected to the power source, is the power LED on the front panel on?

- If not, check the connection of the AC power cord.
- If the power LED is still off, the problem might be a power supply failure.
- Does the server shut down after being on for only a short time?
 - Check for an environmentally induced shutdown. See [Environmental Reporting Features](#).
 - Check the fans. If the fans are not working, the unit will overheat and shut itself down.
 - If the fans are not working, you might need to check the power supply connections to the fans.

Checking this connection will require you to shut down the server, remove any external cables, and open up the chassis. See [Removing the Cover](#).
 - Ensure that the unit intake and exhaust vents are clear.
 - Check the environmental site requirements. See [Site Environment](#).
- Does the server partially boot, but the LEDs do not light?
 - Check for a power supply failure by inspecting the power LED on the front panel of the server. If the LED is on, the power supply is functional.
 - If the LED is off, refer to the *Cisco Information Packet* for warranty information or contact your customer service representative.

Environmental Reporting Features

The Cisco 2140 Series appliance has protection circuits that monitor and detect over-current, overvoltage, and over-temperature conditions inside the unit. If the power supply shuts down or latches off, an AC cycle of off for 15 seconds and on for 1 second resets the power supply. For more information, see [Environmental Monitoring](#).

The following conditions can cause an abnormally high unit temperature:

- Fan failure
- Air conditioner failure in the room
- Airflow blocked to cooling vents

Troubleshooting Adapter Cards, Cables, and Connections

Network problems can be caused by an adapter card, cables or cable connections, or external devices such as a hub, wall jack, WAN interface, or terminal. Check for the following symptoms to help isolate the problem:

- Adapter card is not recognized by the SV Director Server.
 - Make sure that the adapter card is firmly seated in its slot.
 - Check the LEDs on the adapter card. Each adapter card has its own set of LEDs. For information on these LEDs, see [Reading the LEDs](#).

- Make sure that you have a version of software that supports the adapter card. Refer to the documentation that was included with your adapter card.
- Adapter card is recognized, but interface ports do not initialize.
 - Make sure that the adapter card is firmly seated in its slot.
 - Make sure that you have a version of software that supports the adapter card. Refer to the documentation that was included with your adapter card.
- The SV Director Server does not boot properly, or it constantly or intermittently reboots.
 - Make sure that the adapter card is firmly seated in its slot.
 - Check the chassis or the application software. For warranty information, refer to the *Cisco Information Packet* publication that shipped with your appliance or contact your customer service representative.
- The console screen on the terminal connected to the SV Director Server console port is frozen.
 - Check the external console connection.
 - Verify that the parameters for your terminal are set as follows:
 - c) The terminal should have the same data rate that the appliance has (9600 bps is the default).
 - d) 8 data bits.
 - e) No parity generated or checked.
 - f) 1 stop bit.
- The SV Director Server powers up and boots only when an adapter card is removed.
 - Check the adapter card. There might be a problem with the adapter card. Refer to the documentation that was included with your adapter card.
 - For warranty information, refer to the *Cisco Information Packet* publication that shipped with your appliance or contact your customer service representative.
- The SV Director Server powers up and boots only when a particular cable is disconnected.
 - There might be a problem with the cable. For warranty information, refer to the *Cisco Information Packet* publication that shipped with your appliance or contact your customer service representative.

Reading the LEDs

There are several LEDs on the SV Director Server. LEDs serve the following purposes:

- Indicate that basic power is available to the unit.
- Guide you to a broken adapter card, or to one that has failed its diagnostics.

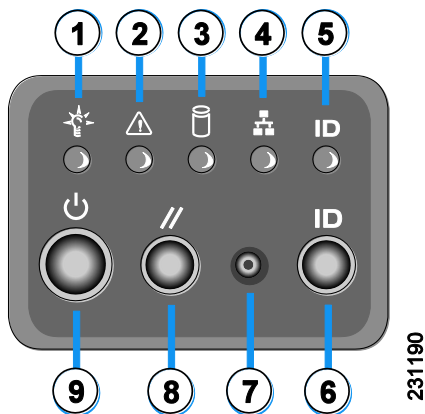
- Give an indication that traffic is flowing through the adapter card to the server.

The LEDs on the front panel of the SV Director Server and corresponding adapter card are aids for determining server and adapter performance and operation.

Front-Panel LEDs

Figure 34 shows the locations of the server's front-panel LEDs.

Figure 34. Front-Panel LEDs

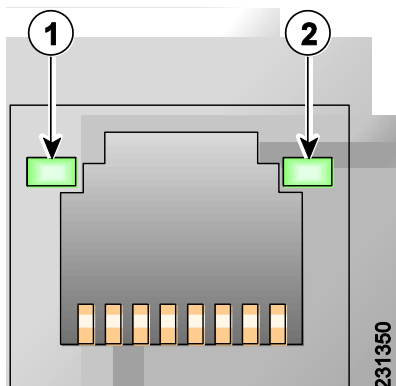


No.	LED	Color	State	Description
1	Power	Green	On	Power on
		Off	Off	Power off
2	Status	Green	On	Standby or ready for operation
		Green	Blinking	Degraded operation (for example, power supply non-redundancy, part of system memory mapped out of BIOS)
		Amber	On	One or more critical fault conditions
		Amber	Blinking	One or more noncritical fault conditions
3	Hard Disk Drive This is an aggregated indication for all hard disk drives. Each hard disk drive contains its own activity and fault LEDs.	Green	On	HDD activity
		Amber	On	HDD fault
4	NICs	Green	On	NIC activity
5	System ID LED can be toggled remotely or by the front-panel ID switch to obtain the system's identity.	Blue		System identity

NIC LEDs

Figure 35 shows the NIC 1 and NIC 2 LEDs located on the rear panel. These LEDs indicate the connection activity and speed of the NIC ports.

Figure 35. NIC 1 and NIC 2 LEDs



No.	LED	Color	State	Description
1	Left	None	Off	10 Mbps connection
		Green	Solid	100 Mbps connection
		Amber	Solid	1000 Mbps (or 1 Gbps) connection
2	Right	None	Off	No network connection
		Green	Solid	Network connection
		Green	Blinking	Transmit/receive activity

Chapter 5 Maintenance

Your Cisco ADE 2140 Series appliance is configured to your order and is ready for installation and startup when it leaves the factory. After you install and configure your SV Director Server, you might have to perform specific maintenance procedures and operations to ensure it is operating properly.

Following these preventive maintenance procedures can keep your unit in top operating condition and minimize the need for costly, time-consuming service procedures.

To help prevent problems, before performing any procedures in this chapter, review the [Safety Precautions](#).

The following sections discuss various environmental factors that can adversely affect unit performance and longevity.

General Exterior Cleaning and Inspection

This section details the cleaning requirements for exterior surfaces of the unit and the inspection of cables and adapter cards.

Caution! Never spray cleaning solution on the surfaces of the chassis. Overspray can penetrate into the chassis and cause electrical problems and corrosion.

Chassis

Use a lint-free, nonabrasive cloth to perform cleaning. *Do not* use a solvent, abrasive cleaning agents, or tissue paper. If the unit is dirty (for example, with thick dust), use a soft damp cloth and wipe the surface of the appliance gently.

Immediately wipe off any water or liquid from the appliance.

Dust and Particles

A clean operating environment can greatly reduce the negative effects of dust and other particles, which act as insulators and interfere with the operation of the unit's mechanical components. In addition to regular cleaning, you should follow these guidelines to deter contamination of the unit:

- Do not permit smoking anywhere near the unit.
- Do not permit food or drink near the unit.

Cables and Connectors

Inspect cables and connectors to and from your server periodically to see if they are worn out or loose.

Adapter Cards

Check the connections on the adapter cards. Be sure they are secured to the chassis and have not been jarred loose or mechanically damaged.

Corrosion

The oil from a person's fingers or prolonged exposure to high temperature or humidity can corrode the gold-plated edge connectors and pin connectors on adapter cards in the unit. This corrosion on adapter card connectors is a gradual process that can eventually lead to intermittent failures of electrical circuits.

To prevent corrosion, you should avoid touching contacts on adapter cards. Protecting the unit from corrosive elements is especially important in moist and salty environments, which tend to promote corrosion. Also, as a further deterrent to corrosion, the unit should not be used in extreme temperatures.

Cooling

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. **Statement 1029**

Exhaust fans in the power supply and in the chassis cool the power supply and the unit by drawing air in through various openings in the front of the chassis and blowing it out the back. However, the fans also draw dust and other particles into the chassis, causing contaminant buildup, which results in an increase in the unit's internal temperature and interferes with the operation of various components.

To avoid these conditions, we recommend keeping your work environment clean to reduce the amount of dust and dirt around the server, thereby reducing the amount of contaminants drawn into the server by the fans.

Temperature

Temperature extremes can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices. Extreme temperature fluctuations can cause chips to become loose in their sockets and can cause expansion and contraction of disk drive platters, resulting in read or write data errors.

To minimize the negative effects of temperature on server performance, follow these guidelines:

- Ensure that the unit is operated in an environment no colder than 50°F (10°C) or hotter than 95°F (35°C).

- Ensure that the unit has adequate ventilation. Do not place it within a closed-in wall unit or on top of cloth, which can act as insulation. Do not place it where it will receive direct sunlight, particularly in the afternoon. Do not place it next to a heat source of any kind, including heating vents during winter.
- Adequate ventilation is particularly important at high altitudes. Server performance may not be optimum when the unit is operating at high temperatures as well as high altitudes.
- Make sure that all slots and openings on the unit remain unobstructed, especially the fan vents on the back of the chassis.
- Clean the appliance at regular intervals to avoid any buildup of dust and debris, which can cause the unit to overheat.
- If the unit has been exposed to abnormally cold temperatures, allow a 2-hour warm-up period to bring it up to normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.

Humidity

High-humidity conditions can cause moisture migration and penetration into the server. This moisture can cause corrosion of internal components and degradation of properties, such as electrical resistance, thermal conductivity, physical strength, and size. Extreme moisture buildup inside the chassis can result in electrical shorts, which can cause serious damage to the unit.

Each unit is rated to operate at 8 to 80 percent relative humidity, with a humidity gradation of 10 percent per hour. Buildings in which climate is controlled by air conditioning in the warmer months and by heat during the colder months usually maintain an acceptable level of humidity for these units. However, if unit is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range.

Altitude

Operating an appliance at high altitude (low pressure) reduces the efficiency of forced, convection cooling and can result in electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

Electrostatic Discharge

Electrostatic discharge (ESD) results from the buildup of static electricity on the human body and certain other objects. This static electricity is often produced by simple movements, such as walking across a carpet. ESD is a discharge of a static electrical charge that occurs when a person whose body contains such a charge touches a component in the appliance. This static discharge can cause components, especially chips, to fail. ESD is a problem particularly in dry environments where the relative humidity is below 50 percent.

To reduce the effects of ESD, you should observe the following guidelines:

- Wear a grounding wrist strap. If a grounding wrist strap is unavailable, touch an unpainted metal surface on the appliance chassis periodically to neutralize any static charge.
- Keep components in their antistatic packaging until they are installed.
- Avoid wearing clothing made of wool or synthetic materials.

Electromagnetic and Radio Frequency Interference

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. **Statement 1029**

Electromagnetic interference (EMI) and radio frequency interference (RFI) from a server can adversely affect devices, such as radio and television (TV) receivers operating near the device. Radio frequencies emanating from the server can also interfere with cordless and low-power telephones.

RFI is defined as any EMI with a frequency above 10 kilohertz (kHz). This type of interference can travel from the server to other devices through the power cable and power source or through the air like transmitted radio waves. The Federal Communications Commission (FCC) publishes specific regulations to limit the amount of EMI and RFI emitted by computing equipment. Each server meets these FCC regulations.

To reduce the possibility of EMI and RFI, follow these guidelines:

- Operate the unit only with the chassis cover installed.
- Ensure that the screws on all peripheral cable connectors are securely fastened to their corresponding connectors on the rear panel.

Magnetism

Because they store data magnetically, hard disk drives are susceptible to the effects of magnetism. Hard disk drives should never be stored near magnetic sources such as the following:

- Monitors
- Printers
- Telephones with real bells
- Fluorescent lights

Power Source Interruptions

Appliances are especially sensitive to variations in voltage supplied by the AC power source. Over-voltage, under-voltage, and transients (or spikes) can erase data from the memory or even cause components to fail. To protect against

these types of problems, power cables should always be properly grounded and one or both of the following methods should be used:

Place the unit on a dedicated power circuit (rather than sharing a circuit with other electrical equipment). In general, do not allow the unit to share a circuit with any of the following:

- Copier machines
- Teletype machines
- Laser printers
- Facsimile machines
- Any other motorized equipment

Besides the above equipment, the greatest threats to a unit's supply of power are surges or blackouts caused by electrical storms.

If a blackout occurs—even a temporary one—while the unit is turned on, immediately turn off the unit and disconnect it from the electrical outlet. Leaving the unit on may cause problems when the power is restored.

Appendix A: Product Specifications

Category	Specification
Product Compatibility	Designed exclusively for operation with the Cisco StadiumVision Director software
CPU	
Processor	Dual Intel Xeon L5410 Quad-Core
Processor internal clock speed	2.33GHz
Level 2 cache	12MB
Frontside Bus	1333 MHz
Thermal Design Power	50W
Maximum processors	2
Processors installed	2
RAM	
Memory maximum	16GB
Memory technology	PC2-5300 DDR2 FB-DIMM SDRAM
Bit-error mitigation	Error Checking and Correction (ECC)
Total RAM slots	8
Hard Disk	
Hard disk bays	6
Hard-disk RPM	10k
Hard disk I/O transfer rate	3.0 GB
Hard disk cache capability	16 MB
Hard-disk interface type	Serial Attached SCSI (SAS)
Hard disk capacity	147GB
MTBF of hard drives	1.0 Mhours (40C)
Power-on hours	24h / 7d (70-80% duty cycle)
RAID Configuration	Hardware RAID (0, 1, 10, 5) through integrated Intel hardware RAID controller with battery backed 128MB write cache memory. Factory configured for RAID1 for initial 2 drives.
Hot Swappable	Yes
Optical Disk	
DVD-ROM	1, front accessible (8X DVD read, 24X CD read)
Network	
Ethernet NIC	2 built into mainboard
Connector	2 RJ-45 connectors on back of server
10BASE-T cable support	EIA Categories 3, 4, or 5 unshielded twisted-pair (UTP) (2 or 4 pair) up to 328 ft (100m)
100BASE-TX cable support	EIA Category 5 UTP (2 pair) up to 328 ft (100m)
1000BASE-T cable support	EIA Category 6 UTP (recommended), Category 5E UTP, 5 UTP (2 pair) up to 328 ft (100m)

Serial		
Serial ports	1 (mutually exclusive alternate connectors for this port at front and at back of chassis)	
Expansion Slots		
Active PCI-X Riser	3 PCI-X 133MHz FH and FL	
USB		
USB 2.0 ports	3 (1 at front and 2 at back of chassis)	
Misc		
Keyboard port	1 PS/2	
Mouse port	1 PS/2	
Power		
Maximum power consumption	600W (maximum output, power supply rating)	
Input power rating	979/990W (@ 110/220Vrms)	
Input low range	90 to 127 (nominal) VAC; 47 – 63Hz	
Input high range	200 to 240 (nominal) VAC; 47 – 63Hz	
Auto-ranging AC input	Yes	
Power Factor Correction	Yes	
Environmental		
Air temperature – Server on	50 to 95°F (10 to 35°C)	
Air temperature – Server off	–40 to 158°F (–40 to 70°C)	
Altitude	3000m at 40C	
Humidity (non-operating)	50%-90%, non-condensing at +35°C	
Dimensions		
Form factor	Rack-mount 2RU	
Rack-mounting	4post rack mounting option included	
Weight	35.0 lb (15.8 kg), standard configuration	
Height	3.45 in. (8.8cm)	
Width	17.0 in. (43.2cm)	
Depth	20.2 in. (50.8cm)	
Regulatory Standards Compliance: Safety and EMC		
Regulatory Compliance	Products with the CE Marking indicate compliance with the 2004/108/EC and 2006/95/EC directives	
Safety	UL 60950 CAN/CSA-C22.2 No. 60950 EN 60950 IEC 60950 AS/NZS 60950	ITE ITE ITE ITE ITE
EMC - Emissions	47CFR Part 15 Class A AS/NZS CISPR22 Class A CISPR22 Class A EN55022 Class A ICES003 Class A	ITE ITE ITE ITE ITE

	VCCI Class A EN61000-3-2 EN61000-3-3 KN22 Class A CNS13438 Class A	ITE ITE ITE
EMC - Immunity	N50082-1 EN61000-6-1 EN55024 CISPR24 KN immunity series	ITE ITE ITE ITE

Appendix B: TCP/UDP Ports Used by the SV Director Server

SV Director Input Ports	Value
tcp 22	ssh
udp 514	syslog
tcp 3306	mysql
tcp 8080	Tomcat
SV Director Output Ports	Value
tcp 22	ssh
tcp 80	Used for: -http 4305 web ui -Addressing POS over web services (at least with Quest) - Addressing the phones for desktop image management. - Accessing CUCM to look up speed dials (used by SV Director)
tcp 443	https 4310 web GUI
tcp 873	rsync
tcp 7040	java jmx management interface (JMX)
tcp 777	dmp http commands
tcp 10000	svd v1.5 binary commands
tcp 10001	svd v2.0 http
tcp 8000	CUAE control
tcp 3389	CUAE windows remote
desktop (rdp) tcp ????	CUAE management address udp multicast
udp multicast group for SV Director commands	default = 239.192.0.254:50001

Appendix C: Ordering Information

Table 11 lists the BOM to use when ordering the SV Director Server. The quantities shown allow for platform redundancy.

Table 11. Cisco SV Director Server BOM

Item	Cisco Part Number
Cisco ADE 2140 Series Appliance	CADE-2140-K9
4-post Sliding Rail Rack-Mount Kit for ADE 2130/2140	CADE-2U-RAILS
1 additional AC Power Supply for ADE 2130/2140	CADE-2U-AC-PSU
1 additional Power Cord, US	CAB-AC
Additional 2 GB RAM (for Cisco ADE 2130/2140)	CADE-RAM-25EF
147 GB SAS HDD (for Cisco ADE 2130/2140)	CADE-HDD-A2100147=

