Hardware Installation Guide

Alteon 700 Series™

Next Generation Web Switch

Part Number: 050055, Revision A, June 2000

AlteonWebSystems
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Regulatory Compliance

FCC Class A Notice: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference. 2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Do not make mechanical or electrical modifications to the equipment.

VCCI Class A Notice: This is a Class A product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

CE Notice: The CE mark on this equipment indicates that this equipment meets or exceeds the following technical standards: EN50082-1, EN55022, EN60555-2, EN61000-4-1, EN61000-4-2, EN61000-4-3, EN61000-4-4, and EN61000-4-5.

Safety Information

Caution—The management processor module in this product contains a Lithium Battery. Batteries are not customer replaceable parts. They may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble or recharge.

Caution—Alteon WebSystems products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Alteon WebSystems products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution—Not all power cords have the same ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Alteon WebSystems product.

Caution—Your Alteon WebSystems product is shipped with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

Nordic Lithium Battery Cautions

(Norge) ADVARSEL—Litiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

(Sverige) VARNING—Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

(Danmark) ADVARSEL! Litiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

(Suomi) VAROITUS—Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Taiwan EMC Statement

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Contents

Preface

This manual describes the features and installation process of the Alteon 700 Series switch hardware.

Who Should Use This Book

This manual is intended for network installers and system administrators engaged in setting up, configuring and maintaining a network. It assumes that you are familiar with installing similar network hardware, laying and connecting network cables, and safely connecting power.

How This Book Is Organized

Chapter 1, "Introducing the Alteon 700 Series," provides general information about the switch and its features. It also includes a labeled illustration of the switch's physical features.

Chapter 2, "Preparing for Installation," helps you get ready for installing the switch. It covers safety precautions, hardware configuration requirements, and helps you select the proper environment for your switch.

Chapter 3, "Installing the Basic Chassis," provides detailed steps for mounting the switch chassis and attaching power cords.

Chapter 4, "Power Supplies," helps you determine how many power supplies your system requires, and provides detailed steps for installing, connecting, and powering-up the appropriate AC or DC power supply modules.

Chapter 5, "Basic Switch Operation," describes turning the power on and off, connecting network cables, accessing the switch software, and recognizing and handling failover conditions for each type of module.

Chapter 6, "Network Line-Card Modules," describes how to install or replace any line-card module, and provides illustrations, cable specifications, and the parameters that can be configured for the various line-card modules.

Chapter 7, "Management Processor Modules," describes how to install or replace the management processor modules. It includes information on attaching a terminal for configuring the switch software.

Chapter 8, "Switch Fabric Modules," describes how to install or replace the switch fabric modules.

Chapter 9, "Fan Tray," describes how to install or replace the switch's fan tray.

Chapter 10, "Troubleshooting," helps you identify and resolve some of the problems you might encounter during basic hardware installation and operation.

Appendix A, "Specifications," describes the physical characteristics of the switch and network cables, as well as supported standards and certifications.

Related Documentation

See the following documentation for additional information about this product:

- *Web OS 7.0 Command Reference*
  (Part Number 050066, Revision A, June 2000)

  Contains full documentation on configuring and using the switch's many software features (such as Server Load Balancing and Application Redirection)

- Alteon WebSystems Online: http://www.alteonwebsystems.com

  This website includes the latest manuals, release notes, application notes, and white papers for this and other Alteon WebSystems products.

Typographic Conventions

The following table describes the typographic styles used in this book.

Table 1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	This type is used for names of commands, files, and directories used within the text.	View the `readme.txt` file.
	It also depicts on-screen computer output and prompts.	`Main#`
`AaBbCc123`	This bold type appears in command examples. It shows text that must be typed in exactly as shown.	`Main# sys`
AaBbCc123	This italicized type appears in command examples as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command.	To establish a Telnet session, enter: `host# telnet` *IP-address*
	This also shows book titles, special terms, or words to be emphasized.	Read your *User's Guide* thoroughly.
[ ]	Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.	`host# ls [-a]`

Contacting Alteon WebSystems

Use the following information to access Alteon WebSystems support and sales.

- URL for Alteon WebSystems Online:

  `http://www.alteonwebsystems.com`

  This website includes product information, software updates, release notes, and white papers. The website also includes access to Alteon WebSystems Customer Support for accounts under warranty or that are covered by a maintenance contract.

- E-mail access:

  `support@alteon.com`

  E-mail access to Alteon WebSystems Customer Support is available to accounts that are under warranty or covered by a maintenance contract.

- Telephone access to Alteon WebSystems Customer Support:

  1-888-Alteon0 (or 1-888-258-3660)
  1-408-360-5695

  Telephone access to Alteon WebSystems Customer Support is available to accounts that are under warranty or covered by a maintenance contract. Normal business hours are 8 a.m. to 6 p.m. Pacific Standard Time.

- Telephone access to Alteon WebSystems Sales:

  1-888-Alteon2 (or 1-888-258-3662), and press 2 for Sales
  1-408-360-5600, and press 2 for Sales

  Telephone access is available for information regarding product sales and upgrades.

CHAPTER 1

Introducing the Alteon 700 Series

This chapter provides an overview of the general features and capabilities of the Alteon 700 Series Web Switches.

The Alteon 700 Series switch attaches to the network backbone and interconnect servers using 10 Mbps, 100 Mbps, and 1,000 Mbps Ethernet connections. This flexibility off-loads server-to-server traffic from the backbone, frees backbone bandwidth, and accelerates client-server performance.

Figure 1 The Alteon 700 Series Web Switches

Overview

Alteon 708

The **Alteon 708** is a modular, 8-slot web data center switch that supports up to 64 Fast Ethernet or 16 Gigabit Ethernet ports. With 90 Gbps of aggregate switch bandwidth, the **Alteon 708** can forward 50 million (64 byte) packets per second at Layer 2, Layer 3, and Layer 4 and process 6 million TCP connections per second.

Alteon 714

The **Alteon 714** is a modular, 14-slot web data center switch that supports up to 128 Fast Ethernet or 32 Gigabit Ethernet ports. With 180 Gbps of aggregate switch bandwidth, the Alteon 714 can forward 100 million (64 byte) packets per second at Layer 2 and Layer 3 and process 12 million TCP connections per second.

System Features

Two basic switch models comprise the Alteon 700 Series product line: the **Alteon 708** and **Alteon 714**. Each model supports several plug-in modules and a range of Fast Ethernet and Gigabit Ethernet port configurations.

Table 2 lists the features of the **Alteon 708** and **Alteon 714** switches.

Table 2 Alteon 700 Series Switch Features

Features	Alteon 708	Alteon 714
Total Ethernet ports	up to 64	up to 128
Gigabit Ethernet ports	up to 16	up to 32
10/100 ports	up to 64	up to 128
RISC processors	up to 36	up to 68
Backplane speed	90 Gbps	180 Gbps
L2/L3 forwarding (packets/second)	50M	100M
Session processing per second per port	372K	372K
Concurrent SLB sessions	16 M	32 M
Session processing per second/switch	6 M	12 M
Ethernet switching	yes	yes
IP routing	yes	yes
IP routing interfaces	1024	1024
EtherChannel trunking	yes	yes
VLANs	1024	1024
Web user interface	yes	yes
SNMP private MIB, RMON	yes	yes
Filtering: allow/deny	1024	1024
Redirection filters	1024	1024
Jumbo frames	yes	yes
Local server load balancing	yes	yes
Web cache redirection	yes	yes

Table 2 Alteon 700 Series Switch Features (Continued)

Features	Alteon 708	Alteon 714
Firewall load balancing	yes	yes
Router load balancing	yes	yes
DNS redirection	yes	yes
Application health checks	yes	yes
Full NAT	yes	yes
Real servers	4096	4096
Server groups	1024	1024
Virtual server addresses	unlimited	unlimited
Virtual server blocks	1024	1024
Services per virtual server	8K	8K
Global SLB	optional	optional
Global SLB sites	64	64
Height (rack units)	6U	9U
AC power	615W	1230W
Heat (BTUs)	2098	4197

Distributed Power on Every Port

The Alteon 700 Series provides a next-generation Web switching ASIC at every Gigabit Ethernet port or Fast Ethernet port group. Traffic control services, including content parsing/TCP splicing, are distributed across multiple processors with substantial hardware assist. This distributed processing architecture delivers performance far beyond the bounds of traditional, centralized processor switch architectures. Background tasks such as switch management, routing updates, and running the user interface are implemented in separate management processors.

Full Wire-Speed Throughput

Each switch port delivers full wire-speed throughput at Layer 2, 3, and Layers 4 - 7.

- Wire-speed L2/3 packet throughput up to 1.5 million packets per second.
- Wire-speed L4 session throughput up to 372k sessions per second.
- Up to 180 Gbps

Extensive Internet Traffic Control Services

Running Web OS software, the Alteon 700 Series offers local and global server load balancing, application redirection, non-server (e.g., firewall, router, etc.) load balancing, active-active high availability configurations, bandwidth management, class of service (CoS), and server security services

Robust Filtering Provides Network Traffic Control

Switch-wide filtering rules can be defined on each Alteon 700 Series switch, with any or all rules applied to each port. Administrators can forward or drop packets based on Layers 2, 3, and 4 through 7 attributes, including URLs. Alteon 700 Series switches support line rate filtering for up to 1,024 filters per port.

Web Switching Enhances Server Scalability and Availability

The Alteon 700 Series runs all Web OS services to scale server capacity, ensure application availability, control bandwidth and server resources, and protect servers from malicious attaches and intrusion. Web OS services can be added to the Alteon 700 Series by ordering the appropriate optional software modules.

Jumbo Frames Accelerate Data Transfer

Alteon 700 Series switches automatically and transparently forward Ethernet frames of all sizes, including optional jumbo frames of up to 9,000 bytes. Jumbo frames can reduce packet processing overhead on servers by as much as 85 percent and increase throughput on CPU-bound systems by over 100 percent.

EtherChannel Trunk Groups

The Alteon 700 Series supports EtherChannel-compatible trunk groups, enabling link-level redundancy and load sharing with other EtherChannel-compatible devices.

Comprehensive Network Management

Network managers can configure and monitor all Alteon 700 Series functions via the Web OS BBI (Browser-Based Interface), SNMP applications, and a command-line interface accessed from the console port or via Telnet. The Alteon 700 Series supports a private MIB and four groups of RMON on every port. Port mirroring provides for switch and server performance analysis. The Alteon 700 Series management interface is integrated with HP OpenView 5.0 under UNIX (HPUX, Solaris) and Windows NT.

System Overview

Basic Architecture

The Alteon 700 switch architecture is based on two proprietary ASICs (application-specific integrated circuit): the *WebIC ASIC*, and the *Switch Fabric ASIC*. Each is described below:

WebIC Switch Processor (SP) ASIC

Provides the interface to the network media and switch fabric. It also provides a high-speed memory interface for packet buffering and control information.

A single switch processor, running Web OS software, can support eight Fast Ethernet connections when operating in 100Mbps mode, or one Gigabit connection when operating in Gigabit mode.

The WebIC performs most tasks in silicon, and contains two processors.

Software processing can be inserted at any hardware switching stage while maintaining wire-speed performance.

Switch Fabric ASIC

A high-speed multiple-port crossbar switch, with integrated arbitration and internal buffers.

The full non-blocking crossbar switch fabric interface enables any processor to transfer data to any other processor, using only one switch fabric connection.

A diagram of chip interaction is provided in Figure 2.

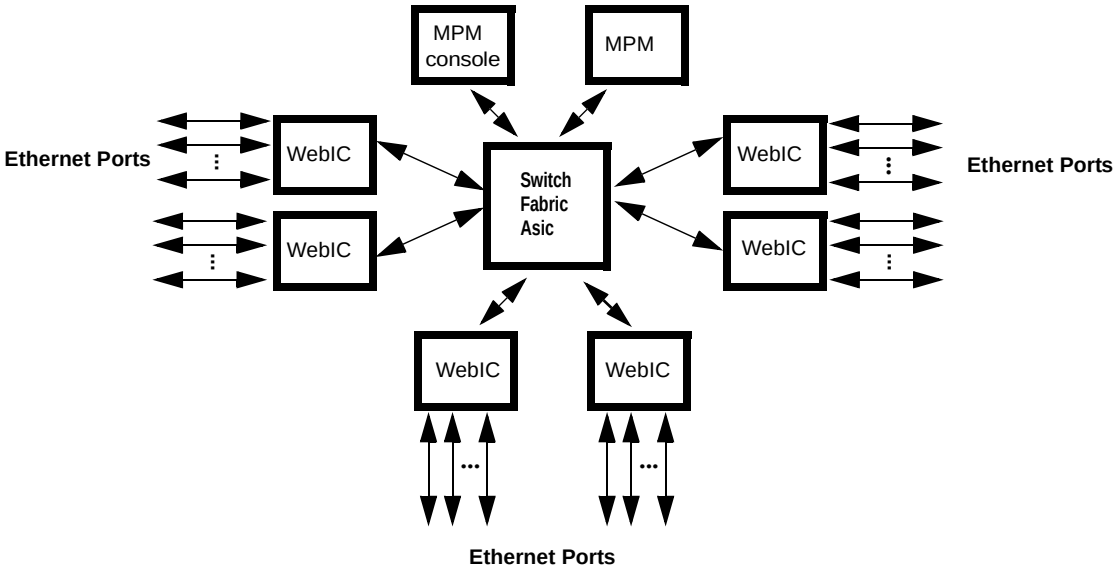


Figure 2 Basic Architecture of WebIC ASIC–Switch Fabric ASIC

In the system shown above, there is typically more than one Switch Fabric IC connected in parallel to all switch processors. Each SP has more bandwidth into the switch fabric than it has on its Ethernet ports.

System Modules

The Alteon 700 Series Web Switch comprises a system chassis that houses one or more of each module type listed in Table 3, depending on the switch model and its optional configuration.

Table 3 Alteon 700 Series System Modules

Module	Function
Management Processor Module (MPM)	Controls switch initialization and system configuration and monitors switch functions. Includes non-volatile RAM that stores the Web OS switch software and configuration.Also controls the CLI (command-line interface), BBI (browser-based interface), SNMP operation, and other common functions.
Switch Fabric Module (SFM)	The SFM provides Layer 2 switching, moving data from the switch processor on the line-card module to the output wire. It comprises a 45 Gbps crossbar fabric. **Alteon 708:** The switch is supplied with two SFMs. One SFM is required for either Gigabit Ethernet or Fast Ethernet. To support both, two SFMs are required. If switch is used to support a single-speed network, the second SFM can be used for redundant operation. **Alteon 714:** Two SFMs are required for Gigabit Ethernet, and one SFM is required to support Fast Ethernet. An additional SFM can be added for redundancy.
Line-Card Modules (LCM)	Three types of line-card module are currently supported. The specifications for each are listed below: 10/100BASE-T Fast Ethernet LCM: ■ 16 ports, with RJ-45 connectors ■ 2 switch processor chips, each with 16 MB memory 1000BASE-SX Gigabit Ethernet LCM: ■ 4 ports, 1000 BASE SX, with SC fiber connectors ■ 4 switch processor chips, each with 16 MB memory 1000BASE-T Gigabit over Copper LCM: ■ 4 ports, 100/1000Mbps, RJ45 connectors ■ 4 switch processor chips, each with 16 MB memory
Power Supplies	Provides power to the switch. **Alteon 708:** One AC or DC power supply included. A second can be added for redundancy. **Alteon 714:** Two power supplies are included. A third supply can be added for redundancy

Table 3 Alteon 700 Series System Modules (Continued)

Module	Function
Fan Tray	The fan tray provides cooling for the management processor, switch fabric, and line-card modules. The fan tray features high-capacity cooling fans and an inboard processor to monitor inlet air temperature and regulate fan speed. **Alteon 708:** Fan tray holds four fans. **Alteon 714:** Fan tray holds six fans.

NOTE – The management processor, switch fabric, line-card, and power supply modules supported by the **Alteon 708** and **Alteon 714** are identical and can be used in either switch.

Physical Features

Alteon 708

Figure 3 shows the **Alteon 708** switch with the optional DC power supply.

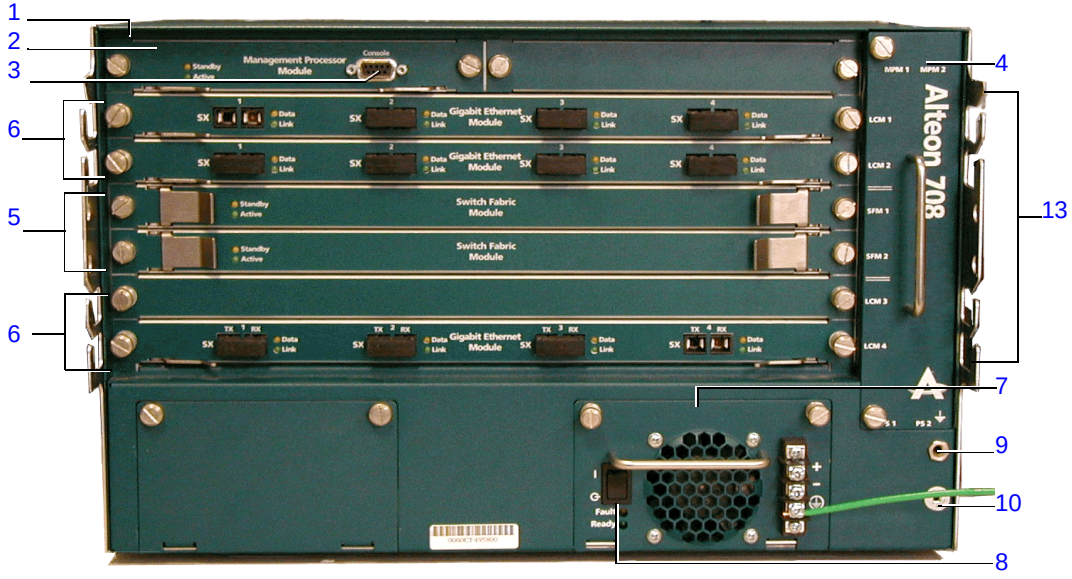


Figure 3 Alteon 708 Front Panel

Alteon 714

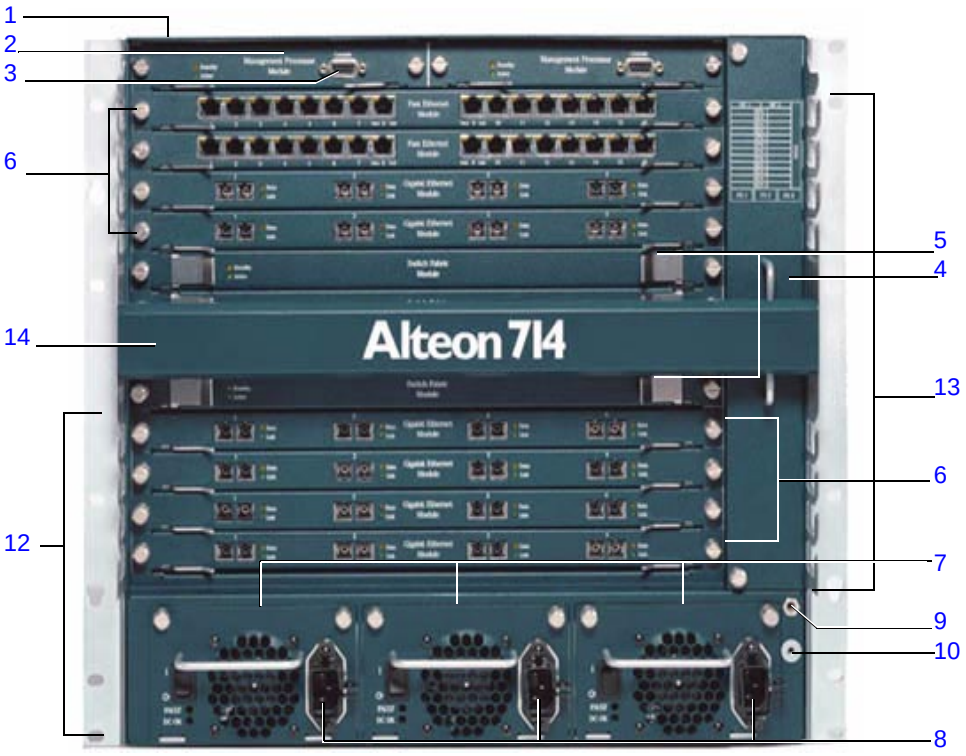


Figure 4 **Alteon 714** Front Panel

Table 4 700 Series Switch Components

Item	Description	Notes
1	Switch Chassis	This metal chassis houses all the other switch components. The built-in backplane interconnects all installed switching modules.
2	Management Processor Module Slots	One management processor module is required. A second module can be added for redundant operation, in the event the first module fails. Management processor modules reside in dedicated slots at the top of the chassis.
3	Console Port	Each management processor module has a female DB-9 serial connector for console access to the Web OS configuration and information menus.

Table 4 700 Series Switch Components (Continued)

Item	Description	Notes
4	Fan Tray	One fan tray can be installed. The fan tray is hot-swappable. The fan tray holds either four fans on the **Alteon 708**, or six fans on the **Alteon 714**. The fan tray can operate even if one of the fans fails.
5	Switch Fabric Module (SFM) Slots	Two SFMs can be installed on the **Alteon 708**. Four SFMs can be installed on the **Alteon 714**. The SFMs reside in dedicated slots in the center of the chassis, and cannot be inserted in to other slots.
6	Line Card Module Slots	Up to four LCMs can be installed on the **Alteon 708**. Up to eight LCMs can be installed on the **Alteon 714**. LCMs cannot be inserted into SFM slots.
7	Power Supply Bays	Each power supply module has LED indicators for power on and power fail conditions.
8	On/Standby Power Switch	This switch has two positions: ⏻ (standby) and | (on). In the standby mode, the power supply is active and its internal fan will run, but it does not supply the switch with power. When on, the installed power supply is selected to provide power to the switch.
9	Chassis Grounding Nut	The #8-32 nut can be used for connecting the chassis to the local ground reference. The #8-32 screw, lock washer, and ground strap are not provided.
10	ESD Connector	The ESD banana jack is used for connecting personal antistatic devices, such as wrist straps.
11	Non-Skid Feet (not shown)	Four rubber non-skid feet can be attached to the base of the switch, for table mounting only.
12	Bracket Mounting Holes	The screw holes on the chassis side panels are for attaching the included cable management and rack-mounting brackets, if desired.
13	Cable Management Brackets	Cable management brackets attach to the sides of the switch, and can be used to hold cables for each line card module.
14	Logo Bar	The Alteon logo bar may be used to secure cables.
15	Rack Mounting Brackets (not shown, see page 39)	Two brackets can be mounted onto the sides of the switch chassis in order to mount the switch onto a rack.

Module LEDs

The tables below describe the conditions represented by the state of the module LEDs.

Table 5 Management Processor and Switch Fabric LEDs

LEDs	State	Description
Active	On	The green LED lights to indicate that the module is currently active.
	Off	■ If Active LED is Off, and Standby LED is lit, the module in standby mode. ■ The Active and Standby LEDs are Off during booting, or when power is turned off.
Standby	On	The yellow LED lights to indicate that the module is in standby mode.
	Off	■ If Standby LED is Off and Active LED is lit, the module in active mode. ■ The Active and Standby LEDs are Off during booting, or when power is turned off.

Table 6 1000Base-SX and 10/100Base-T Line-Card Module LED States

LED	State	Description
Data	Blinking	Data detected on the port.
	Off	No data detected on the port.
Link	On	Good link.
	Off	No link; could be a result of a bad or missing cable, or bad connector.
	Blinking	Port has been disabled by software.

Table 7 100/1000Base-T Gigabit Ethernet over Copper Line-Card Module LED States

LED	State	Description
Data	Blinking	Brief bursts of data detected on the port.
	On	Streams of data detected on the port.
	Off	No data detected on the port.
1000	On	Good 1000 Mbps (Gigabit) Ethernet link.
	Off	No 1000 Mbps link; possible link at different speed, possible bad or missing cable, bad connector, or configuration mismatch.
100	On	Good 100 Mbps Fast Ethernet link.
	Off	No 100 Mbps link; possible link at different speed, possible bad or missing cable, bad connector, or configuration mismatch.

CHAPTER 2

Preparing for Installation

This chapter covers topics you should consider prior to installing the Alteon 700 Series:

- Precautions to keep in mind during installation and use of this product
- Selecting the proper environment for the chassis
- Unpacking the chassis
- Gathering the proper modules required for your network application
- Determining maximum lengths for network cables

Precautions

Safety Notices

CAUTION—The following precautions are issued to prevent hazards to your health while installing and operating the product. Failure to heed the following important points could result in serious bodily injury or death.

General Precautions

- Dangerous voltage is always present while the product is plugged into an electrical outlet. Never insert foreign objects into the chassis, even when the power seems to be off. To reduce electrical hazards, keep water and other fluids away from the product.
- Do not touch uninsulated electrical wires. This includes network, modem, telephony, and power cables.
- Main power is fully disconnected only by unplugging the power cords from the power outlet. For safety purposes, be certain that the plugs and power outlets are within easy reach of the operator.
- Avoid overloading your electrical supply circuits. Electrical ratings are printed on the nameplates of all your equipment. Be sure that your supply circuits and wiring can support the rated power draw of whatever equipment is used.
- The management processor module in this product contains a Lithium Battery that is not user-replaceable. The battery may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble or recharge the battery.
- To avoid injury, do not lift the chassis by the power supply handles or the fan tray handles. These handles are meant to ease the module installation and removal process and will not bear the weight of the switch chassis.
- Do not place or rack-mount the switch in any way which would exceed the maximum weight bearing capacity of the surface or rack, or which would cause potentially hazardous uneven mechanical loading.

AC Power

- This product is designed to work with a single-phase power system having a grounded neutral conductor. To reduce the risk of electric shock, do not plug this product into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.
- This product is shipped with a grounding type (three-wire) AC power cord. To reduce the risk of electric shock when using AC power, always plug the cord into a grounded power outlet.
- Not all AC power cords have the same ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with this product.

DC Power

- Due to the open nature of the DC power connectors, this switch chassis is intended for use in a restricted access location only.

Important Material Precautions

CAUTION—The following precautions are issued to prevent risks to your equipment. Failure to heed the following points could cause improper operation or damage to the switch or its modules.

- Modules and circuit boards must be kept in their anti-static storage bags when not installed in the switch.
- Installation or removal of modules must be performed in a static-free environment. Use the chassis grounding port to establish proper ground connection for the system, and use the ESD banana jack to connect your personal anti-static device (such as a wrist-strap). See Figure 3 on page 22 and Figure 4 on page 23 for the location of these ports. Use of anti-static mats is also recommended.
- Do not disassemble any module or chassis. They have no user-serviceable parts. Contact Customer Support when service or repair is needed.

Selecting a Location for the Switch

The Alteon 700 Series session switch, like other network and computing devices, requires an electronics-friendly environment. Make sure that the location where you will be installing the switch has the following attributes:

- Reliable power

  An electrical outlet must be within reach of the chassis power cord. Be certain that your electrical supply is compatible with the chassis' power supply: 100 to 240 VAC @ 50 to 60 Hz, 9A.

  Also be certain that your supply circuits and wiring can support the rated power draw of all equipment used.

- Cool, dry ventilation

  The ambient temperature of an operating Alteon 700 Series switch must not exceed 40^{o}C (104^{o}F). When installing the switch in a closed or multi-unit rack assembly, note that the operating ambient temperature of the switch may be higher than the ambient temperature of the room.

  Air is drawn in from the left, and exhausts on the right and front of the unit. Take precautions to ensure that the Alteon 700 Series switch is not drawing in air from adjacent equipment, or exhausting heated air onto other equipment.

  Take any appropriate steps to ensure that the switch does not overheat.

- Ample space

  For proper air circulation, the vents on the sides of the switch should not be blocked or obstructed by cables, panels, or other materials. Leave at least 10 cm (4 inches) clearance for the vents. The rack-mounting kit does not restrict airflow on standard 19-inch equipment racks. Be sure to leave sufficient space in front for access to the network cables and indicator LEDs.

- Limited electromagnetic interference

  Switch performance can be degraded by exposure to powerful electromagnetic noise. For best operation, keep network devices and cables at least 0.7 meters (2 feet) from fluorescent lighting fixtures, and 2 meters (6 feet) from photocopiers, radio transmitters, electric generators, motors, and other sources of strong electromagnetic interference.

Unpacking the Chassis

Carefully unpack the chassis and accessories. Figure 3 on page 22 and Figure 4 on page 23 will help you identify the modules. Check the parts you received against the parts noted on your packing list. A standard Alteon 700 Series switch is shipped with the following modules:

- Alteon 700 Series switch chassis
- **One** (installed) management processor module
- Two (installed) switch fabric modules in the **Alteon 708**, *or*
  Four (installed) switch fabric modules in the **Alteon 714**
- One (installed) fan tray
- One (installed) AC power supply with U.S. power cord in the **Alteon 708**, *or*
  Two (installed) AC power supplies in the **Alteon 714**

NOTE – If the switch will be installed outside the U.S., you must replace the U.S. power cord with one that has been approved for use in the country where the switch is to be installed.

- Blank plates to cover empty module slots and bays:
  - One management processor blank (installed)
  - Two single line-card blanks (installed) on the **Alteon 708**; Four on the **Alteon 714**
  - One switch fabric blank (installed)
  - One double line-card blank (installed) on the **Alteon 708**; Four on the **Alteon 714**
  - One power supply blank (installed on the **Alteon 714**)
- Four rubber feet for table-top placement of the switch
- Two rack-mounting brackets
- Two cable management brackets
- One logo bar
- Eight Phillips screws for installing the rack-mounting and cable management brackets
- Four sets of eight rack-mounting screws: Eight of each type: (10-32, 12-24, M5X.8-6H, or M6X1-6H type screws)
- One serial cable for connecting to the console

Your individual system may include fewer or additional modules, depending on your specifications at the time of purchase. If any of the expected parts are missing or damaged, contact your dealer or Alteon WebSystems sales representative.

Packaging Material

Be sure to keep the original packing material in case you need to ship or store the device in the future. If you need to return the product, you must pack it in the original (or equivalent) packing material or the warranty will be voided.

If you decide to dispose of the packing material, please consider all the relevant environmental regulations for your area.

Required Modules

Because each Alteon 700 Series switch is can be customized to meet your system requirements, your actual switch configuration depends on the following criteria:

- The switch model.
- The number of ports that are required to process network traffic.
- The type of ports required.
- The amount of redundancy you want to build into the switch: Configuring the switch with an additional module of each type, beyond what is supplied in the base model, ensures switch functionality in the event a module fails.

NOTE – The management processor, switch fabric, and line-card modules, as well as the power supplies supported by the **Alteon 708** and **Alteon 714** are identical, and can be used in either switch.

In addition to the chassis and backplane, the 700 series switch is supplied with the standard modules listed in Table 8.

Table 8 Required Modules

Module	Alteon 708	Alteon 714
Management Processor Module	1	1
Switch Fabric Module	2	4
Line-Card Module	Up to 4 LCM's can be added, to support *up to:* ■ 64 Fast Ethernet ports, *or* ■ 16 Gigabit Ethernet ports	Up to 8 LCMs can be added, to support *up to:* ■ 128 Fast Ethernet ports, *or* ■ 32 Gigabit Ethernet ports
Power Supply	1 AC or DC (An additional power supply is recommended for redundancy)	2 AC or DC (An additional power supply is recommended for redundancy)
Fan Tray	1 tray (holds 4 fans)	1 tray (holds 6 fans)

Specifications for Network Cables

A variety of network line-card modules are available for Alteon 700 Series switches. Different line-card modules use different types of network cables. Each cable type has its own requirements for maximum length, as well as different connectors or wiring. The following table will help you plan your network layout.

Port	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)
1000Base-SX	SC full-duplex	Shortwave (850 nm): 62.5 micron MM fiber	2 to 275 meters (6.5 to 902 feet)
		50 micron MM fiber	2 to 550 meters (6.5 to 1804 feet)
1000Base-T	RJ-45	See note below	100 meters (325 feet)
Console (DCE)	Female DB-9	RS-232C (serial)	25 meters (80 feet)

NOTE – 100/1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested using procedures defined in TIA/EIA TSB95.

Additional cable and connector information (including pin diagrams where appropriate) can be found in Chapter 6, “Network Line-Card Modules”.

Installation Summary

- Your Alteon 700 Series switch is shipped in the standard configuration. The modules you ordered are shipped separately.
- Once you've unpacked the switch and reviewed the precautions and requirements presented in this chapter, you are ready to install the switch chassis as described in Chapter 3, "Installing the Basic Chassis.
- For instructions on how to operate the switch, see Chapter 5, "Basic Switch Operation.
- If you received the base **Alteon 708** or **Alteon 714**, only the line-card module(s) need to be installed. For LCM installation instructions, see Chapter 6, "Network Line-Card Modules."
- For instructions describing the installation or replacement of other modules, refer to the appropriate chapter of this guide:
  - Chapter 7, "Management Processor Modules"
  - Chapter 8, "Switch Fabric Modules"
  - Chapter 4, "Power Supplies"
  - Chapter 9, "Fan Tray"

CHAPTER 3

Installing the Basic Chassis

This chapter covers mounting the Alteon 700 Series chassis and connecting power cords.

Mounting the Alteon 700 Series Chassis

The Alteon 700 Series can be placed in two physical configurations:

- Free-standing on a table-top or other flat surface
- Flush-mounted in a standard 19-inch rack

The steps for each of these mounting options are described below.

CAUTION—Always observe the precautions outlined in the manuals for this and all other equipment you are installing. Make sure that you understand the precautions starting on page 28 before attempting to install the switch chassis.

Installing the Chassis on a Table

1. **Attach the four rubber footpads to the bottom of the chassis.**
2. **Remove the adhesive backing from the top of the four rubber foot pads. Center each footpad within one of the square outlines marked on the bottom of the switch chassis and press the footpad firmly against the bottom of the chassis to attach it.**
3. **Using the eight supplied 8-32×.375 screws, attach the cable management brackets (if desired) on the chassis as shown in the following diagram.**

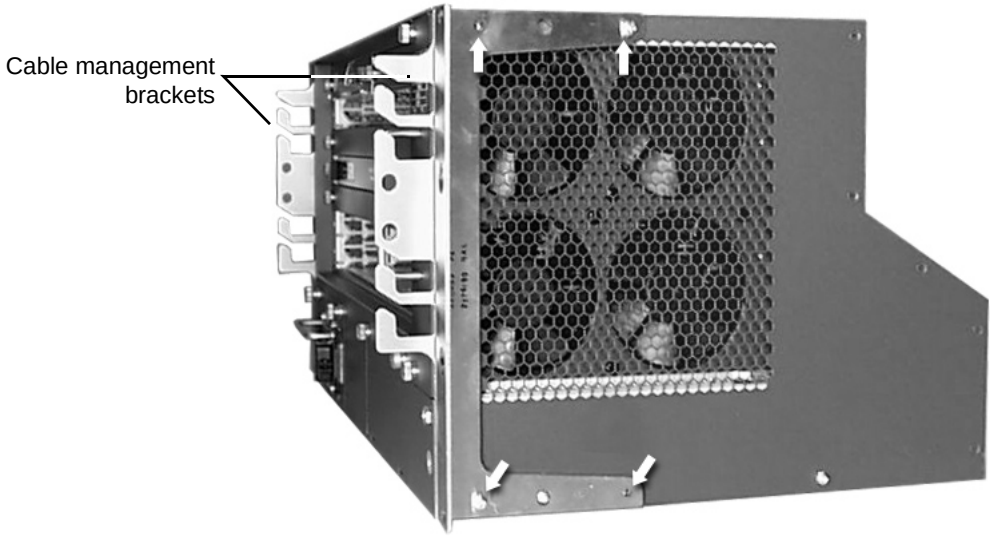


Figure 5 Aligning the Cable Management Brackets

CAUTION—To avoid potential injury, do not lift the chassis by the power supply handles or the fan tray handles. These handles are meant to ease the module installation and removal process and will not bear the weight of the switch chassis.

4. **Place the switch in the desired location.**

   The chassis can stand freely on a rack shelf or any clean, stable surface in your network hardware area. For proper ventilation and stability, keep the chassis upright. Do not mount the unit on its side.

5. **If desired, insert the logo bar between the cable management brackets as shown below.**

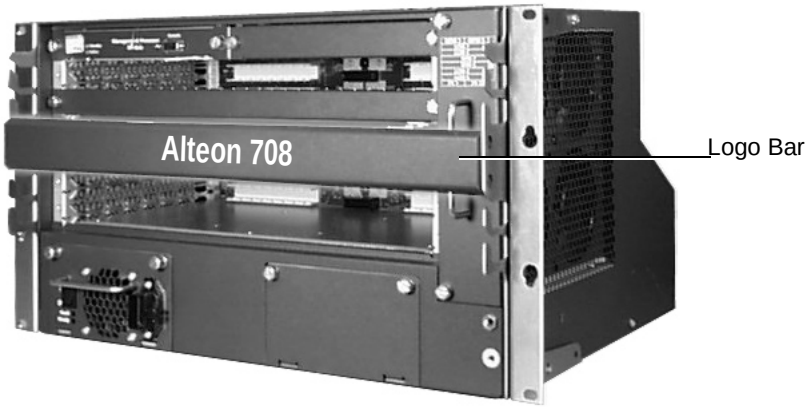


Figure 6 Placing the Logo Bar

Mounting the Chassis on a Rack

NOTE – For a rack mounted installation, do not attach the rubber foot pads to the bottom of the switch.

1. **Select the desired position in your rack assembly.**

   Instead of lifting the heavy switch to test different positions on your rack system, you can use one of the rack-mounting brackets as a guide for selecting the proper position. Align the mounting holes in the bracket with the corresponding holes in the rack frame at the desired height.

2. **Install guide screws in the rack frame.**

   On both rack posts (left and right), install one rack-mounting screw into the hole that lines up with the large, upwardly-slotted hole in the bracket as indicated by the white arrows in Figure 7 below.

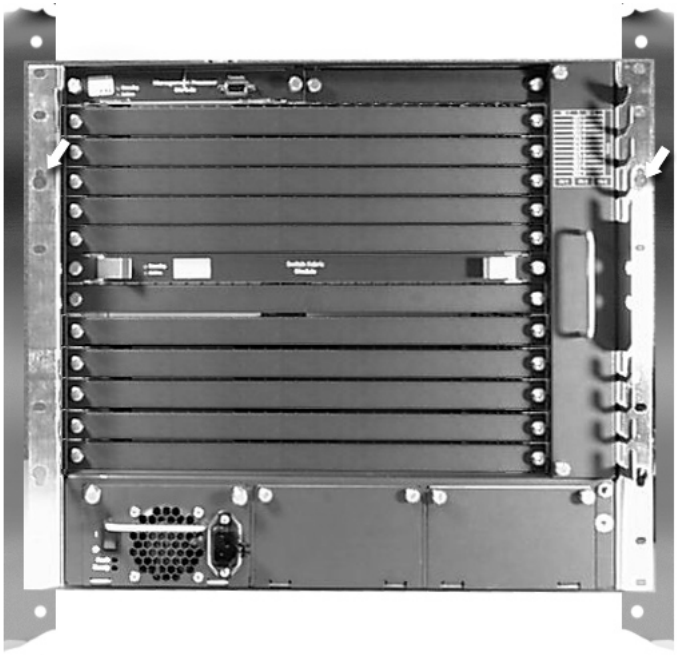


Figure 7 Installing Guide Screws in the Rack Frame

   Use the appropriate screws for your rack-mount system (10-32, 12-24, M5X.8-6H, or M6X1-6H type screws), but do not tighten these screws all the way. The two screws should be firmly attached to the frame, but should be loose enough that the brackets can be easily removed and refitted.

3. **Position the cable management brackets (if desired) on the chassis as shown in Figure 5 on page 36, but do not use the screws to attach them yet.**

4. **Align the rack-mounting brackets.**

   Position the rack-mounting brackets as shown in the following diagrams.

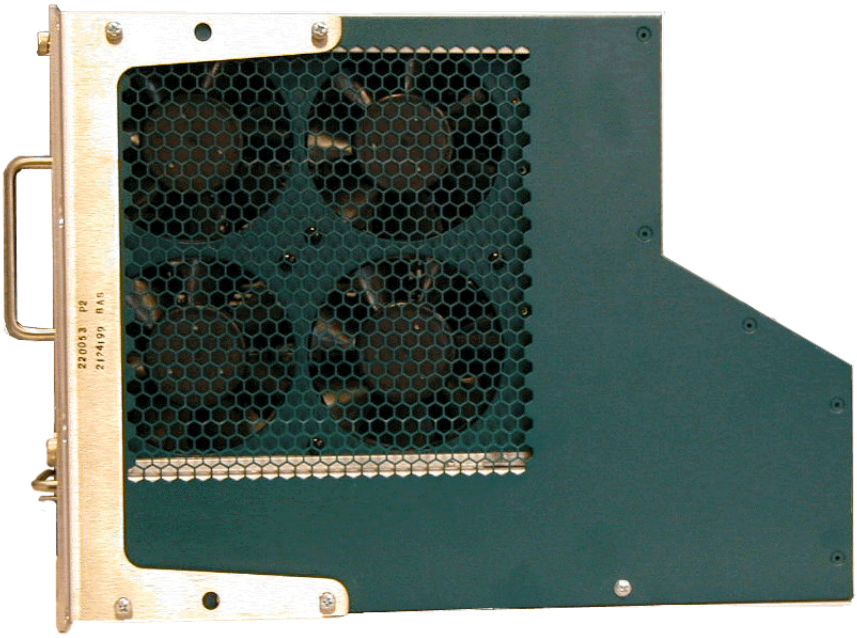


Figure 8 Aligning the Rack-Mounting Brackets

5. **Attach the rack-mounting brackets to the chassis using the supplied 8-32×.375 screws.**

NOTE – The screws will secure both the cable management brackets and the rack-mounting brackets. Fasten the screws securely.

---

6. **Lift the switch into place.**

CAUTION—To avoid potential injury, do not lift the chassis by the power supply handles or the fan tray handles. These handles are meant to ease the module installation and removal process and will not bear the weight of the switch chassis.

Make sure that the large, upwardly slotted bracket holes fit over the guide screws installed in Step 2.

7. **Secure the switch to the rack using six more rack-mounting screws.**

   Use the appropriate screws for your rack-mount system (eight 10-32, 12-24, M5X.8-6H, or M6X1-6H type screws). Fasten the screws securely.

8. **Firmly tighten the guide screws.**

9. **If desired, connect a grounding strap between the rack and the chassis.**

   Use a #8-32 screw and lock washer to connect one end of a grounding strap to the chassis grounding nut. The screw, washer, and grounding strap are not provided with the chassis. The grounding nut is located in a 1/2-inch unpainted circle on the right-hand side of the chassis faceplate, near the bottom. Connect the other end of the grounding strap to the common grounding post of your rack assembly.

10. **If desired, insert the logo bar between the cable management brackets as shown in Figure 6 on page 37.**

NOTE – For information on connecting the power supplies, see Chapter 4, “Power Supplies.”

CHAPTER 4

Power Supplies

This chapter provides detailed instructions for determining how many power supplies are needed, how to install redundant power supplies, and how to replace a power supply in the event of a failure.

The standard Alteon 700 Series switch is delivered with an AC power supply already installed.

Power Supply Module

Faceplate

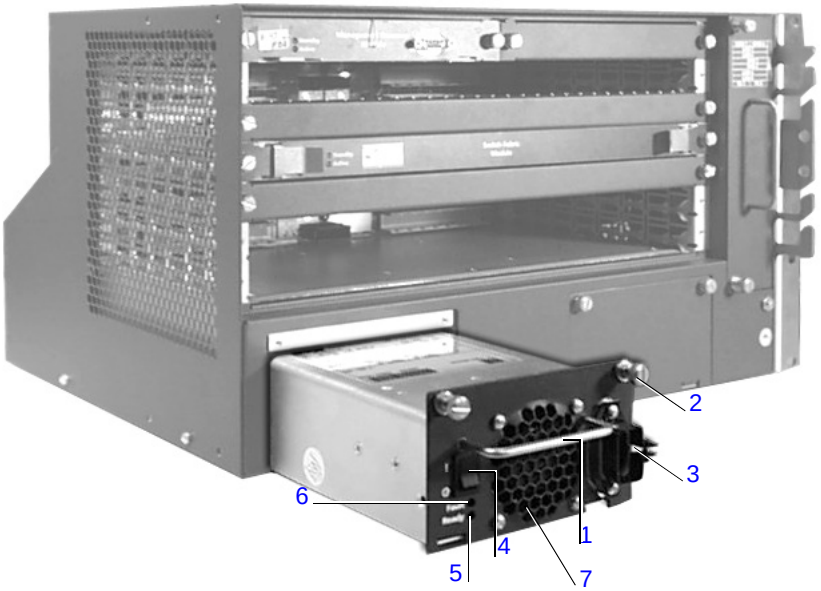


Figure 9 Power Supply Faceplate

CAUTION—Dangerous voltage is always present while the switch is plugged into an electrical outlet. Main power is fully disconnected only by unplugging the power cord(s) from the power outlet. For safety purposes, be certain that power is disconnected before installing or removing a power supply.

Table 9 Components of the Power Supply

Item	Description	Installation Notes
1	Handle for inserting or removing the power supply	While supporting the power supply underneath with your hand, grab the power supply by the handle on its front panel.
2	Panel fastening screws	To secure power supply, finger-tighten the panel fastening screws.

Table 9 Components of the Power Supply (Continued)

Item	Description	Installation Notes
3	Power cord socket	For the AC power supply, this socket accepts the female end of three-prong, grounded AC power cord. This socket assembly also features a cord lock screw which can be tightened over the plug to secure it against being accidentally pulled from the socket. For the DC power supply, three standard wire terminals are used for connecting the positive, return, and ground lead wires.
4	Power switch	This switch has two positions: ⏾ (standby) and | (on). In the standby mode, the power supply is active and its internal fan will run, but the supply does not provide output power. When on, the installed power supply is selected to provide power to the switch.
5	Ready LED	The green LED lights to indicate that the power supply is on and providing power to the switch.
6	Fault LED	The Fault LED indicates that either the input (line) voltage or output voltage is out of regulation.
7	Cooling fan (not shown)	The fan cools the power supply during operation. Do not allow the fan vents to become obstructed.

NOTE – The power supply fan will run whenever the module is plugged in, regardless of the power switch position.

How Many Power Supplies Are Required?

Switch requirements to support power load sharing and power supply redundancy are described below.

Alteon 708: One power supply is required. A second power supply is recommended for power load sharing and redundancy. If one power supply fails, the other will take over.

Alteon 714: Two power supplies are required. A third power supply can be added for power load sharing and redundancy. If one power supply fails, another will take over.

Inserting the Power Supply

NOTE – A redundant power supply module can be hot-swapped, as long as the minimum required number of power supplies are always in operation. For more information, see "How Many Power Supplies Are Required?" on page 43.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Prepare the power supply bay.**

   Power supplies fit into the small rectangular bays at the bottom of the chassis faceplate. To access the desired bay, you may have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

   If you are placing the module into a previously empty slot, you may have to remove the blank cover plate. To do this, turn each of the plate fastening screws counter-clockwise until loose. Remove the blank plate and store it in a safe place.

   If you are replacing the currently installed power supply module, see "Removing the Power Supply" on page 48.

   The slot must be empty and free of obstruction before installing the new power supply module.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty power supply slot.

3. **Verify that the power switch on the power supply being inserted is in the ⏻ (standby) position.**

4. **Verify that the power supply being inserted is not plugged-in.**

5. **Insert the power supply.**

   Hold the power supply by the handle on its front panel. Align the module with the guide-rails in the power supply bay.

   Slowly and gently slide the module toward the chassis backplane. Do not force the module; it should slide easily most of the way.

There will be significant resistance when the module meets the connectors the back of the power module bay. Press firmly to mate the fittings into the connectors, but do not use excessive force.

6. **Push in and finger-tighten the panel fastening screws on the power supply faceplate.**

NOTE – The panel fastening screws should be finger-tightened only. Do not use tools. Do not overtighten. Turn only until you feel moderate resistance.

Connecting Power Cords

AC Power

1. **Verify that the module's power switch is in the ⏻ (standby) position.**
2. **Connect the female end of the AC power cord to the module.**

   If the cord lock screw has been tightened, you may have difficulty inserting the plug into the socket. Verify that the cord lock screw is loose before inserting the plug.
3. **If desired, tighten the cord lock screw to secure the plug into place.**
4. **Plug the other end of the AC power cord into a properly fused outlet.**

NOTE – The power supply fan will run whenever the power supply is plugged in, regardless of whether the power switch in the standby or on position.

DC Power

1. **Turn off DC power at the source.**
2. **Verify that the module's power switch is in the ⏻ (standby) position.**
3. **Connect the DC earth-ground lead to the switch ⏚ terminal.**

   The switch must be connected to a protective earthing terminal in accordance to National Electrical Code (NEC) article 250-160.

   Use copper conductor wire of #12 to #22 AWG. Strip 1 cm (0.4 in.) of the insulation from one end of the ground wire. Loosen the cap of the module's earth-ground terminal (marked ⏚), then insert the bare end of the wire into the terminal's wire slot as shown in Figure 10.

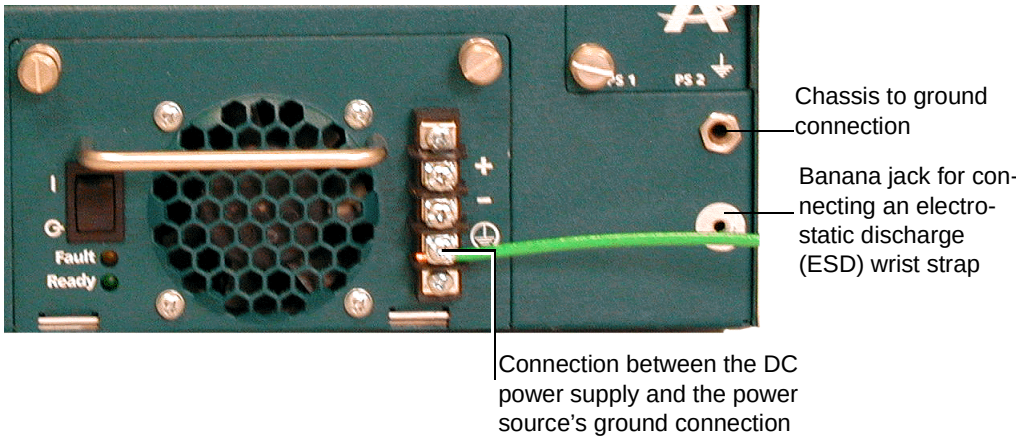


Figure 10 Attaching DC Power to the Power Supply Terminals

   Make sure that the bare wire makes contact with the metal terminal post. Finally, tighten the terminal cap to secure the wire into place

4. **Connect the other end of the DC ground lead to the ground terminal on your DC power source.**
5. **Connect each remaining DC power lead to the appropriate wire terminal on the module.**
6. **Connect the other end of each DC power lead to the appropriate wire terminal of your DC power source.**
7. **Align the gaps in the safety cover with the three leads on the terminal and snap into place.**

Turning Power On

After you have installed (and plugged-in) at least one power supply, you can turn the product on. Set each installed power supply's power switch to the | (on) position.

When the power supply is turned on, the following will occur:

- The power supply's yellow Fault LED may flicker momentarily at the instant of start-up and then go dark. This is normal.
- The power supply's green Ready LED will illuminate steadily to indicate that the module is providing proper power to the switch.

If the power indicators do not function as expected, see Chapter 10, "Troubleshooting".

Turning Power Off

NOTE – Turning the power off will not gracefully shut-down the system and could result in terminated network sessions. For information on performing a graceful shut-down of network line-card activity, see the *Web OS 7.0 Command Reference*.

To turn the product off, set the power switches for all installed power supplies to the ⏻ (standby) position. This will deactivate the switch fan, management, switch fabric, and line-card modules. The power supply fans will still run while the modules are in standby mode.

CAUTION—Dangerous voltage is always present while the product is plugged into an electrical outlet. Main power is fully disconnected only by unplugging the power cords from the power outlet. For safety purposes, be certain that the plugs and power outlets are within easy reach of the operator.

Removing the Power Supply

NOTE – A redundant power supply module can be hot-swapped, as long as the minimum required number of power supplies are always in operation (see "How Many Power Supplies Are Required?" on page 43).

Follow this procedure when removing the power supply for storage, or shipping.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **If hot-swapping the power supply, verify that the redundant supply is properly installed and providing power.**

3. **Prepare the power supply bay so that the power supply can be removed from the switch chassis.**

   Power supplies occupy the rectangular bays at the bottom of the chassis faceplate. The power supply must be free of obstruction before it can be removed.

   To access this slot, you may have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

4. **Set the power switch of the module to be removed to the ⏻ (standby) position.**

5. **Remove the power cord.**

   AC power supply: unplug the power cord from the power outlet and then remove the plug from the module power socket. You may have to loosen the cord lock screw before the plug can be removed.

   DC power supply: first turn off power at the source. Then, disconnect each power lead from the DC power source, loosen the modules' wire terminal caps and remove the power leads.

CAUTION—Failure to turn off DC power at the source may result in a fire or shock hazard.

6. **Loosen the panel fastening screws on the power supply faceplate.**

   Use your fingers to turn the screws counter-clockwise to loosen them. The screws will pop out slightly when completely loose.

NOTE – The panel fastening screws are captive and cannot be completely removed from the faceplate of the module. They will merely become loose. Do not try to remove them.

---

7. **Pull the power supply from the chassis.**

   Firmly grip the handle on the faceplate of the power supply and carefully pull the module out from the chassis. Do not use excessive force. There will be an initial resistance as the module's connectors disengages from the chassis backplane, and then the module will slide out easily.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty power supply bay.

---

8. **Cover empty bays.**

   If you are not installing a new power supply in the empty slot, cover the unoccupied bay with the blank power plate originally shipped with the standard switch chassis. This helps contain the switch's electromagnetic interference. It also prevents dust from entering the chassis and promotes proper airflow for cooling.

9. **To store or ship the power supply, place it in an anti-static bag.**

CAUTION—Moisture build-up can damage the power supply. To keep the module dry during long-term storage (greater than one month), put a desiccant package inside the anti-static bag.

CHAPTER 5

Basic Switch Operation

This chapter describes how to connect the switch to network cables, access Web OS software, and how to change a module from active to standby mode.

NOTE – For information on turning the switch power on or off, see page 47.

Connecting Network Cables

For information about connecting network cables to the switch, see "10/100Base-T Fast Ethernet Network Cables" on page 66, or "1000Base-SX Gigabit Ethernet Network Cables" on page 71.

Accessing the Web OS Software

The management processor module Console port is used for receiving important system information and for configuring the switch. This section explains how to connect a terminal to collect system information. For instructions on using the console to view and configure switch settings, see the *Web OS 7.0 Command Reference.*

Connecting a Terminal

To establish a console (DCE) connection with the Alteon 700 Series, the following is required:

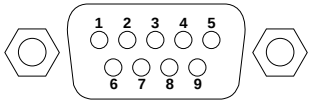
- An ASCII terminal or a computer running ASCII terminal emulation software set to the parameters shown below:

Table 10 Console Configuration Parameters

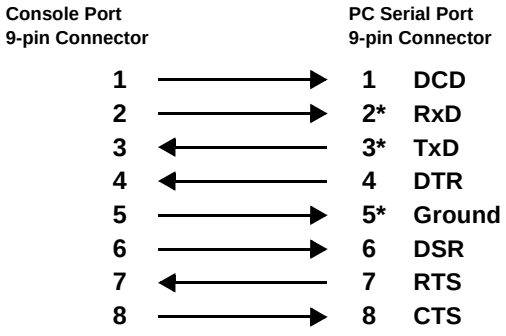
Parameter	Value
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1

- A standard serial cable with a male DB9 connector (see pin-out below):

Table 11 Pinouts for DB9 Serial Connector

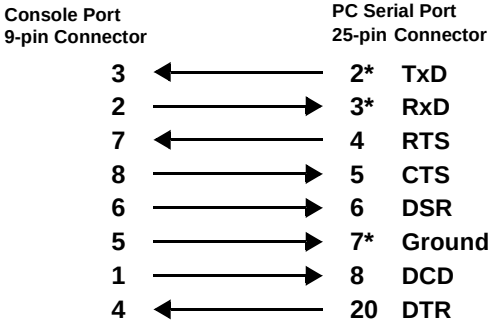
DB9 Serial Connector	Pin	Description
	1	DCD
	2	RxD
	3	TxD
	4	DTR
	5	Ground
	6	DSR
	7	RTS
	8	CTS
	9	Not used

The following figures show the pin assignments for the console port when used with 9-pin or 25-pin connectors.



* Only the pins for RxD, TxD, and Ground are required.

Figure 11 9-pin to 9-pin Connector Pin Assignments



* Only the pins for RxD, TxD, and Ground are required.

Figure 12 9-pin to 25-pin Connector Pin Assignments

Establishing a Console Connection

1. **Connect your terminal to the Console port using the serial cable.**
2. **Power on the terminal.**
3. **To establish the connection, press <Enter> a few times on your terminal.**
4. **Enter the password when prompted.**

   The default administrator password is `admin`. Once your password is verified, the Main menu is displayed. For instructions on using the menus, see the *Web OS 7.0 Command Reference*.

NOTE – Alteon provides a console cable for your convenience. However, console cables are not intended for permanent installation and should be disconnected from the console port after you have finished configuring the switch.

Module Operation and Redundant Behavior

The following modules provide redundant operation if the primary module fails.

Line-Card Module

Line-Card Modules (LCMs) can be configured to provide redundancy using Layer 2, 3, or 4 information. For more information, see the *Web OS 7.0 Command Reference*.

Failed LCMs can be hot-swapped. You can replace a failed LCM with an identical LCM, which will retain the original configuration settings.

To remove a line card module (LCM), change it from Active to Standby mode using the following command:

```
/oper/lcm/down <LCM slot-letter>
```

Alteon 708: LCM slots are A through D starting from the top slot.

Alteon 714: LCM slots are A through H, starting from the top slot.

To bring an LCM back up into Active mode, enter:

```
/oper/lcm/up <LCM slot-letter>
```

Fan Tray

Fans are mounted in a single hot-swappable fan tray. The system can survive while the fan tray is swapped, but not indefinitely. If hot-swapping the fan tray, be sure to replace it with another fan tray immediately. After replacing the fan tray, the switch may detect over temperature and automatically increase the fan speed until normal temperature is restored.

Fan failures and over temperature conditions are reported on the Command-Line Interface and in SYSLOG messages, and can be set to generate SNMP traps.

Power Supply

One supply can be removed from the chassis without interrupting switch operation, as long as the minimum required number of power supplies are installed (see “How Many Power Supplies Are Required?” on page 43).

Power supply failures are reported in the Command Line Interface and in SYSLOG messages, and can be set to generate SNMP traps.

CHAPTER 6

Network Line-Card Modules

This chapter describes the basic installation or replacement of any line-card module in an Alteon 700 Series switch. It includes specific information needed to cable, configure, and test each supported LCM.

An Alteon 700 Series switch can be configured with a mixture of Fast Ethernet and Gigabit Ethernet line-card modules. Each module type has different capabilities and requirements, providing additional network ports or extra functionality to your switch.

Currently, three line-card modules are available for Alteon 700 Series switches. The specifications for each are listed below:

10/100Base-T Fast Ethernet LCM

- 16 ports, RJ-45 connectors
- Two WebIC chips, each with 16 MB memory

For more information, see "10/100Base-T Fast Ethernet LCM" on page 65.

100/1000Base-T Gigabit Ethernet LCM

- 16 ports, RJ-45 connectors
- Four WebIC chips, each with 16 MB memory

For more information, see "100/1000Base-T Gigabit Ethernet LCM" on page 68.

1000Base-SX Gigabit Ethernet LCM

- Four ports, 1000 BASE SX, SC fiber optic connectors
- Four WebIC chips, each with 16 MB memory
- 256K sessions per port

For more information, see "1000Base-SX Gigabit Ethernet LCM" on page 70.

Line-Card Module Requirements

NOTE – To provide network connectivity, at least one line card module (not supplied with base switch model) is required.

Alteon 708

The Alteon 708 supports up to four line-card modules, interconnected via a 90 Gbps switching infrastructure. This product can be configured with a mixture of Fast Ethernet and Gigabit Ethernet modules, with the maximum configuration being 64 Fast Ethernet ports (no Gigabit Ethernet), or 16 Gigabit Ethernet ports (no Fast Ethernet).

Alteon 714

The Alteon 714 supports up to eight line-card modules, interconnected via a 180 Gbps switching infrastructure. This product can be configured with a mixture of Fast Ethernet and Gigabit Ethernet modules, with the maximum configuration being 128 Fast Ethernet ports (no Gigabit Ethernet), or 32 Gigabit Ethernet ports (no Fast Ethernet).

CAUTION—Empty line-card module bays should be covered with the blank module plate originally shipped with the standard switch chassis. This helps contain the switch's electromagnetic interference. It also prevents dust from entering the chassis and promotes proper airflow for cooling.

Line-Card Module Port Settings

Port settings are stored on the management processor module and not on the line-card module. When installing a line-card module, please note the following:

- When a line-card module is installed, if an available port coincides with a previously installed port, the port parameters from the previous configuration will be used.
- If no specific per-port configuration was specified, the switch's default port configuration is used.
- If the switch has not been configured with specific port parameters, the factory default port parameters will be used.

NOTE – Before inserting a new line-card module, verify that there is a switch fabric module to support the line-card module's mode (Fast Ethernet or Gigabit Ethernet). On the Alteon 708, one SFM is required to support each mode. On the Alteon 714, two SFMs are required to support Gigabit Ethernet and another is required for Fast Ethernet LCMs.

Installing the Line-Card Module

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Prepare the line-card slot to receive the line-card module.**

   The line-card slots are each labeled "LCM" at the appropriate height on the fan tray module. To access the desired slot, you may have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

   - If you are replacing a currently installed line-card module, first see "Removing the Line-Card Module" on page 62.
   - If you are placing the module into a previously empty slot, you may have to remove the blank cover plate. To do this, turn each of the plate fastening screws counter-clockwise until loose. Remove the blank plate and store it in a safe place.
   - If you are removing the double-height blank plate, be sure to cover one of the empty slots with one of the single blank plates included with the standard chassis. Store the removed blank in a safe place.

The slot must be empty and free of obstruction before installing the new line-card module.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty line-card slot.

3. **Insert the line-card module into the chassis.**

   Align the module board with the guide-rails in the line-card slot.

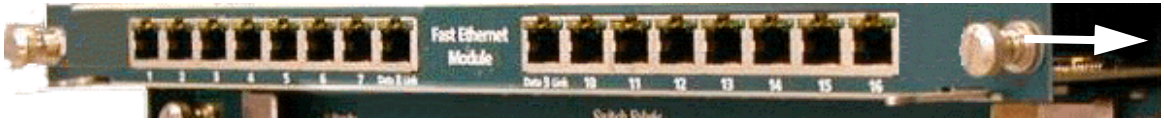


Figure 13 Insert the Line-Card Module

Open the insertion levers away from the module faceplate as shown below and gently slide the module toward the chassis backplane. Do not force the module; it should slide easily most of the way.

Figure 14 Open the Insertion Levers

When the back of the module reaches the chassis backplane, you will feel significant resistance. Close both insertion levers simultaneously against the module faceplate as shown below to firmly mate the module's circuit board into the connectors at the chassis backplane.

Figure 15 Close the Insertion Levers to Mate the Module

4. **Push in and finger-tighten the panel fastening screws on the line-card module faceplate.**

NOTE – Do not use tools to tighten the panel fastening screws. Do not overtighten. Turn only until you feel moderate resistance.

---

5. **Connect network cables.**

   See "10/100Base-T Fast Ethernet Network Cables" on page 66, "100/1000Base-T Gigabit Ethernet Network Cables" on page 69, or "1000Base-SX Gigabit Ethernet Network Cables" on page 71 for information about connector wiring specifications (where appropriate) for each supported line-card module.

6. **Enable the line-card module.**

   To bring up a line-card module, you need to log into the Web OS switch software as network administrator and use the following command:

```
/oper/lcm <lcm-slot-letter> up
```

NOTE – For more information about enabling modules, refer to the Chapter 9, "The Operations Menu," in the *Web OS 7.0 Command Reference*.

---

7. **Configure the module according to its individual function.**

   After installation, line-card modules require configuration. "Configurable Options" on page 72 provides information about the configurable parameters for each supported line-card module.

Removing the Line-Card Module

Follow this procedure when removing a line-card module for replacement, storage, or shipping.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **If replacing a line-card module, perform a graceful shut-down of the module's network ports.**

   To shut down the port(s), you need to log into the Web OS switch software as network administrator and use the following command:

   ```
   /oper/port <port-number> down
   ```

   NOTE – For more information about disabling ports and modules, refer to the Chapter 9, "The Operations Menu," in the *Web OS 7.0 Command Reference*.

3. **Perform a graceful shut-down of the line-card module(s).**

   To shut down the module, you need to log into the Web OS switch software as network administrator and use the following command:

   ```
   /oper/lcm <lcm-slot-letter> down
   ```

4. **Observe that the correct LCM has been disabled—its port link LEDs should be blinking.**

5. **Unplug the module's network ports.**

   Identify the proper line-card module before unplugging port cables. The line-card slots are each labeled ("LCM") and numbered at the appropriate height on the fan tray module.

6. **Prepare the line-card module to be removed from the switch chassis.**

   The module must be free of obstruction before it can be removed. To access the desired slot, you may have to move other network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

7. **Loosen the panel fastening screws on the line-card module faceplate.**

   Use your fingers to turn the screws counter-clockwise to loosen them. The screws will pop out slightly when completely loose.

NOTE – The panel fastening screws are captive and cannot be completely removed from the faceplate of the module. They will merely become loose. Do not try to remove them.

8. **Pull the module from the chassis.**

   Open the ejection levers away from the module faceplate as shown below and then gently pull the module out from the chassis. Do not force the module; it should slide out easily.

Figure 16 Use the Ejection Levers to Free the Line-Card Module

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty fan tray slot.

9. **Cover empty bays.**

   If you are not installing a new line-card module in the empty slot, cap the unoccupied bay with one of the blank line-card plates originally shipped with the standard switch chassis. This helps contain the switch's electromagnetic interference. It also prevents dust from entering the chassis, and promotes proper airflow for cooling.

10. **If storage or shipping is required, place the module in an anti-static bag.**

CAUTION—Moisture build-up can damage the module. To keep the module dry during long-term storage (greater than one month), include a desiccant package inside the anti-static bag.

10/100Base-T Fast Ethernet LCM

The 10/100Base-T Fast Ethernet line-card module is used for connecting the switch to 10 Mbps Ethernet segments and/or 100 Mbps Fast Ethernet segments. All 16 switch ports are auto-negotiating and support half-duplex and full-duplex operation.

Faceplate

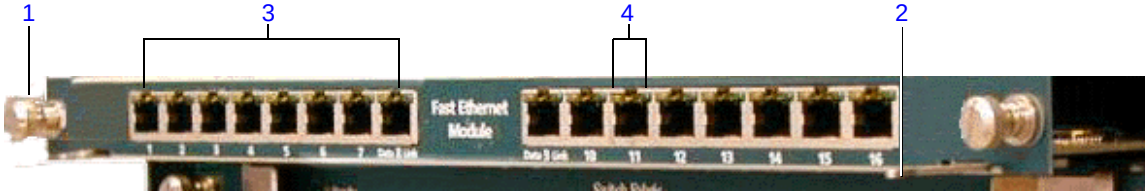


Figure 17 10/100Base-T Fast Ethernet Line-Card Module Faceplate

Table 12 Components of the 10/100Base-T Fast Ethernet LCM Faceplate

Item	Description	Installation Notes
1	Panel fastening screws	To secure module, you need only finger-tighten panel fastening screws.
2	Insertion/ejection levers	Use these levers only when the fastening screws (above) are loose. Do not force these levers open or closed, or you may damage the switch or module. When opened away from the chassis, the levers pry the module from its docking connection for easy removal. When closed toward the switch, the levers ease the module securely into its docking connection.
3	10/100Base-T ports	Each of these 16 ports accepts an RJ-45 plug for 10/100Base-T Ethernet/Fast Ethernet connections.
4	Port LEDs	There are two LEDs for each port. The Data LED appears in the upper-left corner of the port. The green Link LED appears in the upper-right corner of the port. These LEDs light to indicate various port connection conditions, as listed in Table 13.

Table 13 10/100Base-T Port LED States

LED	State	Description
Data	Blinking	Data detected on the port.
	Off	No data detected on the port.
Link	On	Good link
	Off	No link; could be a result of a bad cable or bad connector.
	Blinking	Port has been disabled by software.

10/100Base-T Fast Ethernet Network Cables

The following table lists the cable characteristics for connecting to 10/100Base-T ports:

Table 14 10/100Base-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

NOTE – 100Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and EIA/TIA-568-A (1995) and tested using procedures defined in TIA/EIA TSB95.

Using Straight-Through vs. Crossover Cables

10Base-T cables can be wired “straight-through” or “crossover,” depending on the devices being connected. If the device being connected with an FE line-card module is a server or workstation, a straight-through cable must be used, wherein each pin on one connector is wired to the same numbered pin on the other connector, e.g., pin 1 is wired to pin 1.

When connecting 10/100Base-T ports to a network device, such as a hub, router, or an LCM on another switch, use a crossover cable. Since the port sockets on network devices are wired the same, certain pairs of wires must be swapped to avoid connecting the same pins together, e.g., receive-to-receive. In a crossover cable, the transmit pins on one connector are wired to the receive pins on the other end, and vice versa. Figure 18 illustrates the wiring for both cable types.

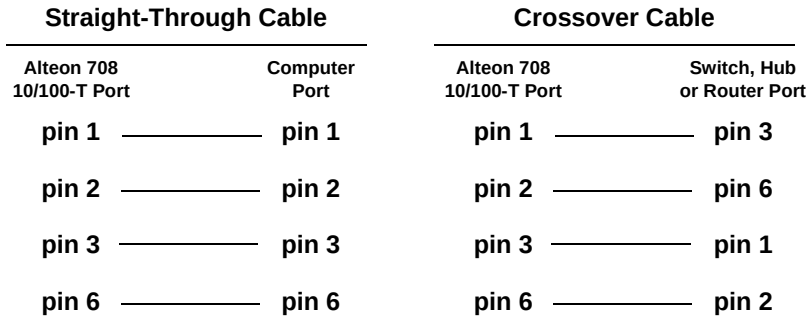


Figure 18 10/100Base-T Cable Wiring

NOTE – You can attach the 10/100Base-T port to a switch, hub, or router using a straight-through cable if the device has an “uplink” setting that you can enable.

100/1000Base-T Gigabit Ethernet LCM

The 1000Base-T Gigabit Ethernet over Copper line-card module is used for connecting the switch to 1000 Mbps copper Ethernet segments. All four ports are auto-negotiating and support full-duplex operation for Gigabit Ethernet, and half-duplex operation for Fast Ethernet.

Faceplate

Figure 19 10/100Base-T Fast Ethernet Line-Card Module Faceplate

Table 15 Components of the 10/100Base-T Fast Ethernet LCM Faceplate

Item	Description	Installation Notes
1	Panel fastening screws	To secure module, you need only finger-tighten panel fastening screws.
2	Insertion/ejection levers	Use these levers only when the fastening screws (above) are loose. Do not force these levers open or closed, or you may damage the switch or module. When opened away from the chassis, the levers pry the module from its docking connection for easy removal. When closed toward the switch, the levers ease the module securely into its docking connection.
3	100/1000Base-T ports	Each of these four ports accepts an RJ-45 plug for 100/1000Base-T Fast Ethernet / Gigabit Ethernet connections.
4	Port LEDs	There are three LEDs to the left of each port. These LEDs light to indicate various port connection conditions, as listed in Table 16 on page 69.

Table 16 100/1000Base-T Gigabit Ethernet over Copper Port LED States

LED	State	Description
Data	Blinking	Brief bursts of data detected on the port.
	On	Streams of data detected on the port.
	Off	No data detected on the port.
1000	On	Good 1000 Mbps (Gigabit) Ethernet link.
	Off	No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
100	On	Good 100 Mbps Fast Ethernet link.
	Off	No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.

100/1000Base-T Gigabit Ethernet Network Cables

Port Type	Connector	Media	Maximum Distance
100/1000Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

NOTE – 1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested for additional performance using testing procedures defined in TIA/EIA TSB95.

1000Base-SX Gigabit Ethernet LCM

The 1000Base-SX Gigabit Ethernet line-card module is used for connecting the switch to 1000 Mbps Ethernet fiber segments. All four network ports are auto-negotiating and support half-duplex and full-duplex operation.

Faceplate

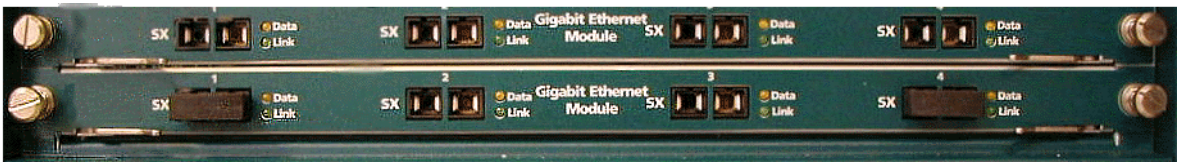


Figure 20 1000Base-SX Gigabit Ethernet Fiber Optic Line-Card Module Faceplate

Table 17 Components of the 1000Base-SX Gigabit Ethernet Line-Card Module

Item	Description	Installation Notes
1	Panel fastening screws	To secure module, finger-tighten panel fastening screws.
2	Insertion/ejection levers	**Note**: Use these levers only when the fastening screws (above) are loose. Do not force these levers open or closed, or you may damage the switch or module. When opened away from the chassis, the levers pry the module from its docking connection for easy removal. When closed toward the switch, the levers ease the module securely into its docking connection.
3	1000Base-SX ports	Each of these four ports accepts an SC-type fiber optic connector.
4	Port LEDs	There are two LEDs to the right of each port. These LEDs light to indicate various port connection conditions, as listed in Table 18.

Table 18 1000Base-SX Port LED States

LED	State	Description
Data	Blinking	Data detected on the port
	Off	No data detected on the port
Link	On	Good link
	Off	No link; could be a result of a bad cable or bad connector
	Blinking	Port has been disabled by software

1000Base-SX Gigabit Ethernet Network Cables

The figure below illustrates an SC-type fiber optic connector used for Gigabit Ethernet connections on the Alteon 700 Series :

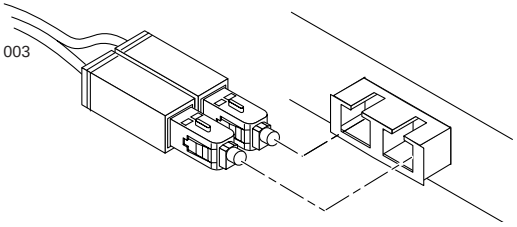


Figure 21 Fiber optic connector for Alteon WebSystems switches

The following table lists the cable characteristics for connecting to 1000Base-SX ports:

Table 19 1000Base-SX Link Characteristics

Connector	Media	Maximum Distance
SC full-duplex	Shortwave (850 nm):	
	62.5 micron MM fiber	2 to 275 meters (6.5 to 902 feet)
	50 micron MM fiber	2 to 550 meters (6.5 to 1804 feet)

Configurable Options

Port link and line-card configurable options are described in Table 20. These parameters can be accessed using the Port Link Configuration Menu in *Web OS Release 7.0*. To access this menu, enter the following command from the Main menu, followed by the link type:

```
/cfg/port port-number link
Enter new link type [none|FE|GE-SX|1000Base-T]:
```

Table 20 Link Options

Option	Description
`speed`	Sets the link speed; the choices include: • "Any," for automatic detection (default) • 10 Mbps • 100 Mbps • 1000 Mbps
`mode`	Sets the operating mode; the choices include: • "Any," for autonegotiation (default) • Full-duplex • Half-duplex
`fctl`	Sets the flow control; the choices include: • Autonegotiation (default) • Receive flow control • Transmit flow control • Both receive and transmit flow control • No flow control
`auto`	Enable or disable auto-negotiation for the port.
`current`	Displays current link configuration

CHAPTER 7

Management Processor Modules

This chapter describes the basic installation or replacement of a management processor module in an Alteon 700 Series switch.

The Management Processor Module (MPM) oversees and controls the operation of the switch. It also boots up and coordinates the other modules, and powers the command-line interface, browser interface, SNMP operation, and other common functions. The MPM also monitors the temperature of system modules, and ensures the fan tray processor periodically adjusts the fan speed to regulate the internal temperature of the switch.

The MPM includes non-volatile RAM that stores the Web OS switch software and configuration.

CAUTION—The management processor module contains a Lithium Battery that is not user replaceable. The battery may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble or recharge it.

Faceplate Diagram

Figure 22 Management Processor Faceplate

CAUTION—Empty management processor module bays must be covered with the blank module plate originally shipped with the standard switch chassis. The plate helps contain the switch's electromagnetic interference, prevents dust from entering the chassis, and promotes proper airflow for cooling.

Table 21 Components of the Management Processor Faceplate

Item	Description		Installation Notes
1	Panel fastening screws		To secure module, finger-tighten panel fastening screws.
2	Insertion/ejection levers		Use these levers only when the fastening screws are loose. Do not force these levers open or closed, or you may damage the switch or module. When opened away from the chassis, the levers pry the module from its docking connection for easy removal. When closed toward the switch, the levers ease the module securely into its docking connection.
3	Console Port		The female DB-9 serial connector labeled "Console" is used for the console (DCE) connection.
4	LED Indicators	Active Standby	The green LED lights to indicate that the module is active. The yellow LED lights to indicate that the module is in standby mode.

Inserting a Management Processor Module

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Prepare the management processor slot to receive the MPM.**

   The management processor slots are the two half-width slots located near the top of the chassis faceplate. To access the desired slot, you may have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

   If you are replacing a currently installed MPM, first see "Removing a Management Processor Module" on page 77.

   Otherwise, if you are placing the module into a previously empty slot, you may have to remove the blank cover plate. To do this, turn each of the plate fastening screws counter-clockwise until loose. Remove the blank plate and store it in a safe place for future use.

   The slot must be empty and free of obstruction before installing the new management processor module.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty management processor slot.

3. **Insert the management processor module into the chassis.**

   Align the module board with the guide-rails in the management processor module slot as shown below:

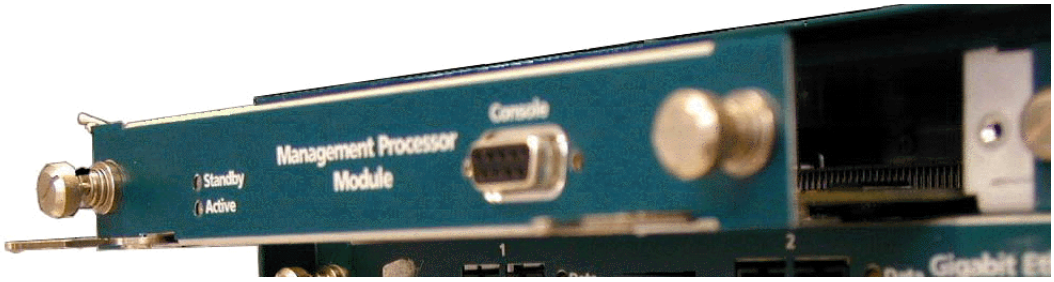


Figure 23 Aligning the Management Processor Module

4. **Open the insertion levers away from the module faceplate and gently slide the module toward the chassis backplane. Do not force the module; it should slide easily most of the way.**

   When the back of the module reaches the chassis backplane, you will feel significant resistance. Close both insertion levers simultaneously against the module faceplate as shown below to firmly mate the module's circuit board into the connectors at the chassis backplane.

5. **Push in and finger-tighten the panel fastening screws on the management processor module faceplate.**

NOTE – The panel fastening screws should be finger-tightened only. Do not use tools. Do not overtighten. Turn only until you feel moderate resistance.

---

6. **Connect the console cable to the console port.**

   The management processor module Console port is used for receiving important system information and for configuring the switch. To connect a terminal to collect system information, see "Accessing the Web OS Software" on page 51.

7. **Enter "Return" until you see a prompt in the terminal window.**

8. **Configure the module for your specific network topology and applications.**

NOTE – For instructions on using the console to view and configure switch settings, see the *Web OS 7.0 Command Reference.*

Removing a Management Processor Module

Follow this procedure when removing a management processor module for replacement, storage, or shipping.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Perform a graceful shut-down of the switch's line-card modules.**

   To shut down the line-card module(s), you need to log into the Web OS switch software as network administrator and use the following command:

   ```
   /oper/lcm <lcm-slot-letter> down
   ```

   NOTE – For more information about disabling ports and modules, refer to the Chapter 8, "The Operation Menu," in the *Web OS 7.0 Command Reference*.

3. **Observe that the ports are down; the LEDs should be blinking.**

4. **Unplug the console cable from the module's console port.**

5. **Prepare the management processor module to be removed from the switch.**

   The module must be free of obstruction before it can be removed. To access the desired slot, you may have to move other network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

6. **Loosen the panel fastening screws on the management processor module faceplate.**

   Use your fingers to turn the screws counter-clockwise to loosen them. The screws will pop out slightly when completely loose.

   NOTE – The panel fastening screws are captive and cannot be completely removed from the faceplate of the module. They will merely become loose. Do not try to remove them.

7. **Pull the module from the chassis.**

   Open the ejection levers away from the module faceplate as shown below and then gently pull the module out from the chassis. Do not force the module; it should slide out easily.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty management processor slot.

8. **If storage or shipping is required, place the module in an anti-static bag.**

CAUTION—Moisture build-up can damage the module. To keep the module dry during long-term storage (greater than one month), put a desiccant package inside the anti-static bag.

CHAPTER 8

Switch Fabric Modules

Each switch fabric module (SFM) provides a high-speed, multiple-port, 45 Gbps crossbar fabric with 18 paths.

Each fabric runs at either 100 Mbps or 1 Gbps.

This chapter describes the basic installation or replacement of any switch fabric module in an Alteon 700 Series switch.

Faceplate

Figure 24 Switch Fabric Module Faceplates

CAUTION—Empty switch fabric module bays should be covered with the blank module plate originally shipped with the standard switch chassis. This helps contain the switch's electromagnetic interference. It also prevents dust from entering the chassis and promotes proper airflow for cooling.

Table 22 Components of the Switch Fabric Module Faceplate

Item	Description	Installation Notes
1	Panel fastening screws	To secure module, finger-tighten panel fastening screws.
2	Insertion/ejection levers	Use these levers only when the fastening screws are loose. Do not force these levers open or closed, or you may damage the switch or module. When opened away from the chassis, the levers pry the module from its docking connection for easy removal. When closed toward the switch, the levers ease the module securely into its docking connection.
3	"Active" LED indicator	The green LED lights to indicate that the module is active.
4	"Standby" LED indicator	The yellow LED lights to indicate that the module is in standby mode.

How Many Switch Fabric Modules are Needed?

Alteon 708

One switch fabric module is required for each class of line-card module (Fast Ethernet vs. Gigabit Ethernet) installed in the switch. The base Alteon 708 comes equipped with two switch fabric modules, which can be used in two ways:

- **One Mode:** If your switch uses only Fast Ethernet line-card modules, or only Gigabit Ethernet line-card modules, then one switch fabric module is used for the line-card modules, and the second module is used for redundancy. One will be active while the other waits in standby mode.
- **Mixed Mode:** If your switch uses a combination of Fast Ethernet and Gigabit Ethernet line-card modules, then two switch fabric modules will be used. Both modules will be active. Because the Alteon 708 provides two slots for fabric modules, installing an SFM for redundancy is not possible with this configuration.

Alteon 714

The base Alteon 714 comes equipped with four switch fabric modules.

- **Fast Ethernet LCM:** If your switch uses only Fast Ethernet line-card modules, then *one* switch fabric module is used for the Fast Ethernet modules, and the second module is used for redundancy. One will be active while the other waits in standby mode.
- **Gigabit Ethernet LCM:** If your switch uses only Gigabit Ethernet line-card modules, then *two* switch fabric modules are used for the Gigabit Ethernet modules. In this case, you could install a third module for redundancy. Two switch fabric modules will be active, while the third module waits in standby mode.
- **Mixed Mode:** If your switch uses a combination of Fast Ethernet and Gigabit Ethernet line-card modules, then *three* switch fabric modules are required. With this configuration, we recommend that you install a fourth module for redundancy. Three modules will be active, while the fourth module waits in standby mode.

Inserting a Switch Fabric Module

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the “Precautions” on page 28.

2. **Prepare the switch fabric slot to receive the switch fabric module.**

   The switch fabric slots are labeled “SFM1” and “SFM2”(on the 708), and “SFM1” through “SFM4” (on the 714), at the appropriate height on the fan tray module. To access the desired slot, you may have to remove the logo bar. You may also have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

   If you are replacing a currently installed switch fabric module, first see “Removing a Switch Fabric Module” on page 86.

   Otherwise, if you are placing the module into a previously empty slot, you may have to remove the blank cover plate. To do this, turn each of the plate fastening screws counter-clockwise until loose. Remove the blank plate and store it in a safe place for future use.

   The slot must be empty and free of obstruction before installing the new switch fabric module.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty switch fabric slot.

3. **Insert the switch fabric module into the chassis.**

   Align the module board with the guide-rails in the switch fabric slot as shown in Figure 25.

Figure 25 Inserting the Switch Fabric Module

   Open the insertion levers away from the module faceplate and gently slide the module toward the chassis backplane. Do not force the module; it should slide easily most of the way.

   When the back of the module reaches the chassis backplane, you will feel significant resistance. Close both insertion levers simultaneously against the module faceplate to firmly mate the module's circuit board into the connectors at the chassis backplane.

4. **Push in and finger-tighten the panel fastening screws on the switch fabric module faceplate.**

NOTE – The panel fastening screws should be finger-tightened only. Do not use tools. Do not overtighten. Turn only until you feel moderate resistance.

---

5. **Enable the new switch fabric module.**

   The switch fabric module will come up automatically if it was not previously brought down using:

   ```
   /oper/sfm <module-number> down
   ```

   If you need to bring up a switch fabric module, log into the Web OS switch software as network administrator and use the following command:

   ```
   /oper/sfm <module-number> up
   ```

   NOTE – For more information about enabling modules, refer to the Chapter 8, "The Operation Menu," in the *Web OS 7.0 Command Reference*.

6. **If necessary, reenable the line-card modules served by the new switch fabric module.**

   To bring up a line-card module, you need to log into the Web OS switch software as network administrator and use the following command:

   ```
   /oper/lcm <lcm-slot-letter> up
   ```

   NOTE – The line-card modules will automatically be re-enabled when you power up the switch.

Switch Fabric Module Operation

During normal operation, one switch fabric module will be in active mode, and the other switch fabric module will be in standby mode. The status of each switch fabric module will be indicated by their LEDs. For more information, see "Module LEDs" on page 25.

Software Control Commands

The switch fabric module can be controlled through the SFM Operations Menu. To access this menu, enter **`/oper/sfm`** from the Main menu.

```
[SFM Operations Menu]
      up      - Bring an SFM up
      down    - Shut an SFM down

>> SFM Operations#
```

To bring a module down before removing it, enter the following from the SFM Operations menu.

```
>> SFM Operations# down <module-number>
```

What Happens if an SFM Fails?

If an SFM fails, the LED lights will turn off. Also, errors will be reported in the Command-Line Interface, in SYSLOG and SNMP messages.

In this case, enter:

```
/info/slot
```

An error message will indicate if the SFM has failed.

If the primary switch fabric module fails, the secondary switch fabric module will automatically change from standby to active mode.

If the secondary SFM fails, the system will report the failures on the command-line interface, in SYSLOG messages, and via SNMP traps

If the failed module comes back up and is functional, it will enter Standby mode.

To troubleshoot the failed module, read Chapter 10, "Troubleshooting".

Removing a Switch Fabric Module

Follow this procedure when removing a switch fabric module for replacement, storage, or shipping.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **If you are replacing a switch fabric module, first check which LCMs are served by the SFM you want to remove, using the `/info/slot` command.**

   Example

```
>> Main# /info/slot
------------------------------------------------------------------
 Slot    State         LCM type          SP States
-----  ---------  ------------------  ---------------
  A     Running    GIGABIT-SX          SP 0: Running
                                       SP 1: Running
                                       SP 2: Running
                                       SP 3: Running
  B     Running    GIGABIT-SX          SP 4: Running
                                       SP 5: Running
                                       SP 6: Running
                                       SP 7: Running
  C      Empty
  D     Running    GIGABIT-SX          SP 12: Running
                                       SP 13: Running
                                       SP 14: Running
                                       SP 15: Running

SFM slot    Usage     LCM slots
--------   -------   -----------
    1         GE       A B   D
    2      Standby
```

3. **Perform a graceful shut-down of the line-card modules served by the switch fabric module.**

   To shut down a line-card module, log into the Web OS switch software as network administrator and enter the following command from the Main menu:

   ```
   /oper/lcm <lcm-slot-letter> down
   ```

   NOTE – For more information about disabling switch modules, refer to the Chapter 9, "The Operations Menu," in the *Web OS 7.0 Command Reference*.

4. **Perform a graceful shut-down of the switch fabric module.**

   To shut down a switch fabric module, you need to log into the Web OS switch software as network administrator and enter the following command from the Main menu:

   ```
   /oper/sfm <module-number> down
   ```

5. **Prepare the switch fabric module to be removed from the switch chassis.**

   The switch fabric slots are labeled "SFM1" and "SFM2" at the appropriate height on the fan tray module. The desired module must be free of obstruction before it can be removed.

   To access the desired slot, you may have to remove the logo bar. You may also have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

6. **Loosen the panel fastening screws on the switch fabric module faceplate.**

   Use your fingers to turn the screws counter-clockwise to loosen them. The screws will pop out slightly when completely loose.

   NOTE – The panel fastening screws are captive and cannot be completely removed from the faceplate of the module. They will merely become loose. Do not try to remove them.

7. **Pull the module from the chassis.**

   Open the ejection levers away from the module faceplate as shown below and then gently pull the module out from the chassis. Do not force the module; it should slide out easily.

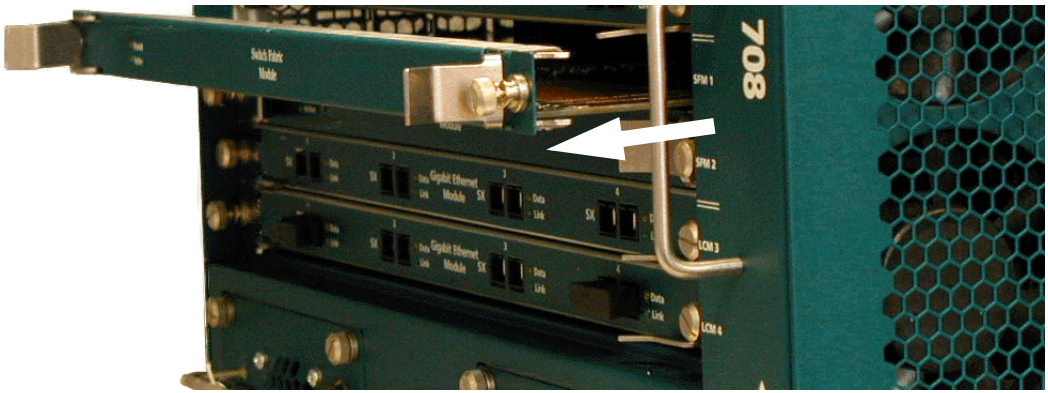


Figure 26 Pulling Out the Switch Fabric Module

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty switch fabric slot.

8. **Cover empty bays. You can use blank LCM plates if necessary.**

   If you are not installing a new switch fabric module in the empty slot, cap the unoccupied bay with one of the blank switch fabric plates originally shipped with the standard switch chassis. This helps contain the switch's electromagnetic interference. It also prevents dust from entering the chassis, and promotes proper airflow for cooling.

9. **If storage or shipping is required, place the module in an anti-static bag.**

CAUTION—Moisture build-up can damage the module. To keep the module dry during long-term storage (greater than one month), put a desiccant package inside the anti-static bag.

CHAPTER 9

Fan Tray

This chapter provides detailed instructions for installing or replacing the fan tray in the event of failure.

The Alteon 700 Series smart fan tray is designed to provide dependable cooling for all the installed management processor, switch fabric, and line-card modules.

The fan tray features **four** (**Alteon 708**), or **six** (**Alteon 714**) high-capacity cooling fans, and an onboard processor. The processor communicates with the Management Processor Module to adjusts the speed of available fans, in order to promote proper cooling.

Fan Tray Faceplate

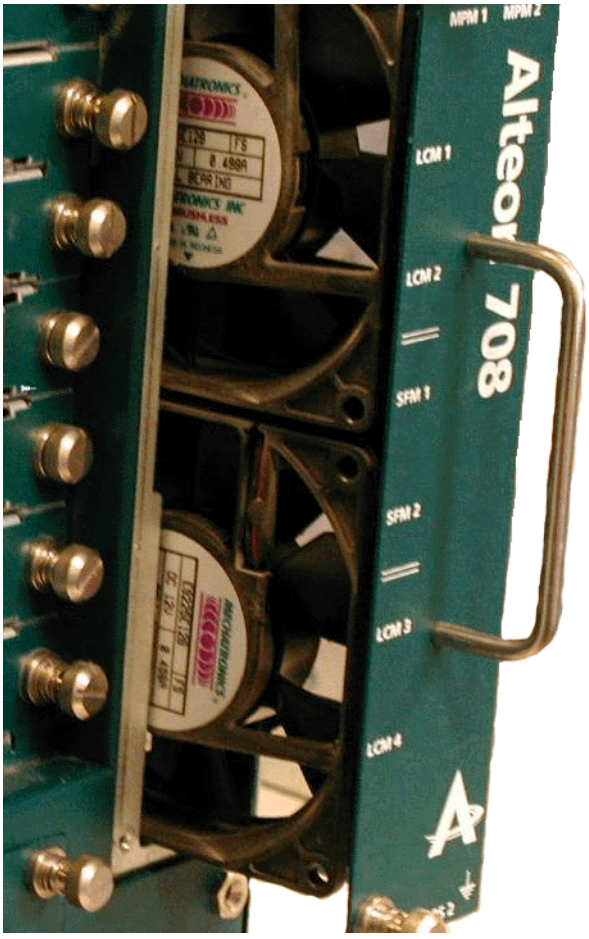


Figure 27 Fan Tray Faceplate

Table 23 Components of the Fan Tray

Item	Description	Installation Notes
1	Handle for inserting or removing the fan tray	Grasp handle firmly and hold the fan tray level when inserting or removing from the slot.
2	Panel fastening screws	To secure module, finger-tighten the panel fastening screws.
3	Chassis slot labels	The chassis slot labels correspond to the LCM and SFM slot numbers.

Inserting the Fan Tray

NOTE – The fan tray is hot-swappable. It can be installed while the switch is running. However, the switch may overheat if the fan tray is not replaced immediately.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Prepare the fan tray slot.**

   The fan tray slot is the tall slot at the right-hand side of the chassis faceplate. To access this slot, you may have to remove the logo bar. You may also have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

   If you are replacing the currently installed fan tray, first see "Removing the Fan Tray" on page 93. The slot must be empty and free of obstruction before installing the new fan tray.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty fan tray slot.

3. **Insert the fan tray.**

   Hold the module by the handle on its front panel. Align the module board with the guide-rails in the fan tray slot as shown below:

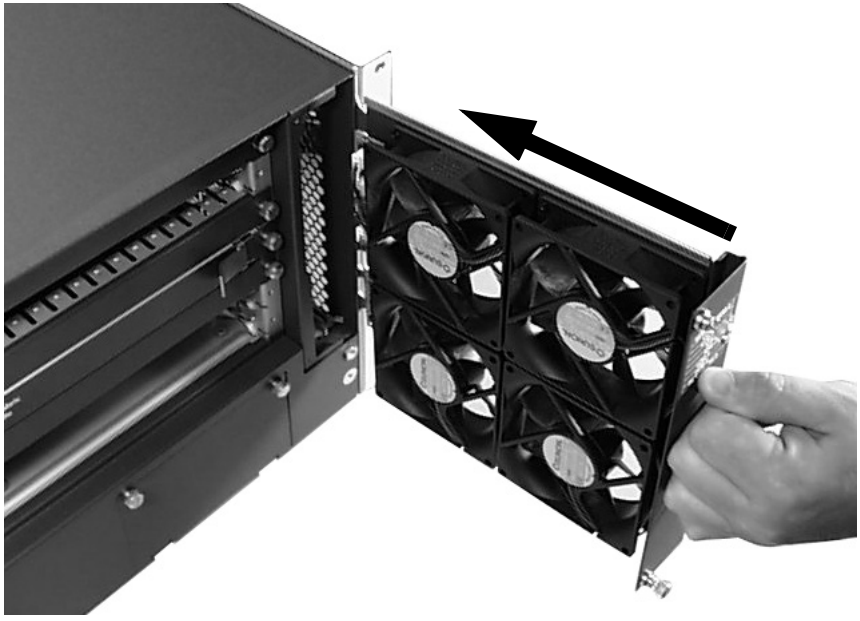


Figure 28 Inserting the Fan Tray

   Slowly and gently slide the fan tray toward the chassis backplane. Do not force the tray; it should slide easily most of the way.

   There will be significant resistance when the module circuit board meets the connectors at the back of the fan tray slot. Press firmly to mate the circuit board into the connectors, but do not use excessive force.

4. **Push in and finger-tighten the panel fastening screws on the fan tray faceplate.**

NOTE – The panel fastening screws should be finger-tightened only. Do not use tools. Do not overtighten. Turn only until you feel moderate resistance.

Fan Tray Operation

Fan Redundancy

If any one fan in the fan tray fails, the remaining fans will increase speed to maintain proper temperature. The system will report fan failures and over-temperature conditions on the command-line interface, in SYSLOG messages, and via SNMP traps.

In normal circumstances, the fan tray requires no user intervention. However, a second fan tray can be stored on-site for backup.

NOTE – Whenever a fan fails, the fan tray should be replaced. While any single fan may fail without impacting system performance, more than one fan failure could cause the switch to overheat.

Hot-Swapping

The fan tray is hot-swappable, meaning that it can be replaced without turning off the power to the switch.

Once you have removed and then replaced the fan tray, the switch may temporarily increase all available fans to maximum speed to restore normal operating temperature.

Removing the Fan Tray

Follow this procedure when removing the fan tray for replacement, storage, or shipping.

1. **Guard against electric shock, as well as electrostatic discharge.**

   To avoid personal injury or damage to electronic equipment, observe the "Precautions" on page 28.

2. **Prepare the fan tray to be removed from the switch chassis.**

   The fan tray occupies the tall slot at the right-hand side of the chassis faceplate. The module must be free of obstruction before it can be removed.

   You may have to move some network cables out of the way. Be careful not to pull or bend the cables too far when moving them.

3. **Loosen the panel fastening screws on the fan tray faceplate.**

   Use your fingers to turn the screws counter-clockwise to loosen them. The screws will pop out slightly when completely loose.

NOTE – The panel fastening screws are captive and cannot be completely removed from the faceplate of the module. They will merely become loose. Do not try to remove them.

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4. **Pull the module from the chassis.**

   Firmly grip the handle on the faceplate of the fan tray and carefully pull the module out from the chassis. Do not use excessive force. There will be an initial resistance as the module's edge-connector disengages from the chassis backplane, and then the module will slide out easily.

CAUTION—To avoid the risk of electrical shock or damage to the switch, do not insert any tool or foreign object into the empty fan tray slot.

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5. **If the system is running, install a new fan tray immediately.**

CAUTION—Do not leave the system running without a working fan tray for any extended period of time. Excessive heat can damage system components or cause improper operation. For fan tray installation, see "Inserting the Fan Tray" on page 91.

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6. **If you need to store or ship the fan tray, place the module in an anti-static bag.**

CAUTION—Moisture build-up can damage the module. To keep the module dry during long-term storage (greater than one month), put a desiccant package in the anti-static bag.

CHAPTER 10

Troubleshooting

This chapter provides useful information for identifying and resolving switch problems.

General Troubleshooting

Using the Troubleshooting Tables

To help you identify the cause of a problem, solutions suggested in the troubleshooting tables are listed in the order recommended to quickly isolate the cause of a switch malfunction. Solutions include, where applicable, the diagnostic test to perform, using the options on the Maintenance Menu. If a module needs to be replaced, see the applicable chapter in this guide for the procedure.

NOTE – If the information provided in the tables below does not help you to fix the switch problem(s) you are experiencing, contact Customer Support, as described in "Contacting Alteon WebSystems" on page 12

Table 24 General Switch Problems

Problem	Probable Cause	Solution/Troubleshooting Checklist
Switch does not power on; no LEDs light, fans do not run.	No power supply installed in the switch	Verify that at least one power supply is installed in the switch chassis.
	Power cable not properly connected	Verify that the power cable is properly plugged into the power source and switch outlet.
	Power switch turned off	Verify that the power switches for all installed power supplies are in the **I** (on) position.
	Chassis power consumption too high for a single power supply, causing the switch to shut down	If you are using the **Alteon 714** switch, verify that at least two power supplies are installed.
	If there is only one power supply installed on the **Alteon 708**, the power supply may be defective. If there are two or three power supplies installed on the **Alteon 714**, one of the power supplies may be defective.	Replace power supply.
	Power cable not functional or does not meet product specifications	Replace power cable with one known to work. To ensure safety, Alteon 700 Series switches require a power cable rated to 10A, 250VAC that conforms to grounded electrical standards.
	Problem with power outlet	Determine if the outlet can power any other device. If it cannot, the outlet fuse (at the fuse box) may be blown or the outlet defective.

Table 24 General Switch Problems (Continued)

Problem	Probable Cause	Solution/Troubleshooting Checklist
Switch temperature exceeds threshold: Temperature sensor error message received at console. Immediate attention required!	Circulation vents blocked	Verify that the air circulation vents on the front, and sides of the switch are free from obstruction by cables, panels, rack frames, or other materials
	One or more cooling fans not functioning correctly.	■ Verify all four (**Alteon 708**) or six (**Alteon 714**) cooling fans inside the Alteon 700 Series switch are running. ■ The fans are located behind the ventilation grill on the right side of the switch. The exhaust from all four fans should be blowing out the left side with roughly equal air pressure (although it is normal for the exhausts to have different temperatures). You can also use a flashlight to check whether the fan blades are moving. If any fan stops during switch operation, contact Customer Support.
	Ambient air temperature is too high for proper cooling	■ Remember that units in a closed or multi-unit rack assembly may have an operating ambient temperature higher than the ambient temperature of the room. The ambient temperature of an operating switch must not exceed **40ºC**. If the operating ambient temperature cannot be lowered before this maximum is reached, turn off the switch and let it cool. ■ It may be necessary to cool the room to a lower temperature or provide a fan for greater air circulation. Resolve the room's cooling and circulation problems before turning the switch back on.

Troubleshooting Line-Card Modules

Once a line-card module has been correctly installed, connected, and configured, it should operate without the need for intervention from the system administrator. Use Table 25 as an aid in troubleshooting line-card module problems.

Table 25 Line-Card Module Problems

Problem	Probable Cause	Solution/Troubleshooting Checklist
Link LED (green) does not light: When you check the link state using the console terminal, the status is reported as "down."	Port configuration mismatch between two connected devices	■ If the switch port is configured with a specific speed or duplex mode (for example, 100 Mbps, full duplex) verify that the other device is set to the same configuration. ■ If the switch port is configured to auto-negotiate, verify that the other device is also set to auto-negotiate. See the *Web OS 7.0 Command Reference* for more information about setting speed and mode. ■ Check the device the switch is being connected to; that it is powered on and correctly configured for Ethernet communication. If the problem persists, try swapping out the device with another one known to work.
	Cable problem	Verify you are using the correct type of cable to connect the switch to other devices: ■ Cable specifications for both 10/100Base-T FE and 1000Base-SX for Gigabit Ethernet are listed in "Port Specifications" on page 103. ■ Determine whether you need to use a straight-through cable or crossover cable to connect an FE line-card module to another device: Use a straight-through cable to connect an FE line-card module to a workstation or server. ■ Use a crossover cable to connect an FE line-card module to another network device, e.g., a switch, hub, or router. For information about crossover cable wiring, see **page 67**.

Table 25 Line-Card Module Problems (Continued)

Problem	Probable Cause	Solution/Troubleshooting Checklist
(continued) Link LED (green) does not light: When you check the link state using the console terminal, the status is reported as "down."	Module problem	■ **SP:** Reboot using **`/oper/sp/down`** *<sp-number>* then **`/oper/sp/up`** *<sp-number>* ■ **LCM:** Reboot using **`/oper/lcm/down <`***lcm-slot-letter*> then **`/oper/lcm/up <`***lcm-slot-letter*> ■ Remove card and reinsert it in module bay. ■ Connect the device to another port on the same LCM. If the link works on a different port, the LCM is defective. ■ Replace the module with one known to work properly. ■ Power off, then power on the chassis.

Troubleshooting the Management and Switch Fabric Modules

Once the Management Processor and Switch Fabric Modules have been correctly installed, connected, and configured, they should operate without the need for intervention from the system administrator. Use the table below as an aid in troubleshooting module problems.

Table 26 General Module Problems

Problem	Probable Cause	Solution/Troubleshooting Checklist
Active or Standby LEDs on the Management Processor Module or Switch Fabric Module do not light	Switch chassis not receiving power	Verify chassis power supplies are properly plugged in and the power switch for each installed power supply is in the **I** (on) position.
	Faulty module	Insert another module of same type in the slot.
	Module not fully seated	Remove the module from its backplane connector and re-insert the module into the connector.
	Module hardware requires re-initialization	■ Using switch software, reset module card. ■ Reset the switch chassis (power off, then power on the switch power supplies).

APPENDIX A

Specifications

Physical Characteristics

Characteristic	Measurement
Width	43.18 cm (17.00 inches) (Standard 19" EIA rack mountable)
Height	**Alteon 708:** 26.59 cm (10.74 inches) **Alteon 714:** 39.9 cm (15.75 in) (9U)
Depth	35.6 cm (14 inches)
Weight	**Alteon 708:** 17 kg (37 lb.) (includes one AC power supply, one Management Processor Module, and two Switch Fabric Modules) 23 kg (50 lb.) (fully loaded) **Alteon 714:** 23 kg (50 lb.) (includes two AC power supplies, one Management Processor Module, and two Switch Fabric Modules) 32 kg (70 lb.) (fully loaded)

Power Requirements

Specification		Measurement
AC Power	Auto-ranging power supply	AC: 90-132 VAC and 180-264VAC@ 47-63 Hz
	Maximum power consumption	Alteon 708: 615W 7A Alteon 714: 1230W 14A
	Heat dissipation (max)	Alteon 708: 2098 BTU Alteon 714: 4197 BTU
DC Power	Auto-ranging power supply	-36 – -72VDC
	Maximum power consumption	Alteon 708: 19A @ -36VDC Alteon 714: 38A @ -36VDC
	Heat dissipation (max)	Alteon 708: 2334 BTU Alteon 714: 4668 BTU

Environmental Specifications

Condition	Operating Specification	Storage Specification
Temperature	0° to 40° C (+32° to +104° F)	–40° to +85° C (–40° to +185° F)
Relative humidity	5 to 85% non-condensing (40° C, 16 hour dwells at extremes)	5 to 95% non-condensing 10° C/hour
Altitude	up to 3,050 meters (10,000 feet)	up to 10,750 meters (35,000 feet)
Shock	10g, 1/2 sine wave, 11 msec	60g, 1/2 sine wave, 11 msec
Vibration, peak to peak displacement	0.005 in. max (5 to 32 Hz)	0.1 in. max (5 to 17 Hz)
Vibration, peak acceleration	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/minute)	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/minute)

Port Specifications

Port	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (328 feet)
100Base-T	RJ-45	Cat. 5 UPT	100 meters (328 feet)
1000Base-SX	SC full-duplex	Shortwave (850 nm): 62.5 micron multimode fiber 50 micron multimode fiber	 2 to 275 meters (6.5 to 902 feet) 2 to 550 meters (6.5 to 1804 feet)
Console (DCE)	Female DB-9	RS-232C (serial)	25 meters (80 feet)

Supported Standards

- VLAN tagging (IEEE 802.1q)
- Logical Link Control (IEEE 802.2)
- 10BASE-T/100BASE-TX (IEEE 802.3,802.3u)
- Flow Control (IEEE 802.3x)
- RMON (RFC 1757)
- SNMP (1213 MIB-II, 1643 Ethernet, 1493 Bridge)
- 1000BASE-SX (IEEE 802.3z)
- IP
- RIP1
- RIP2
- OSPF
- BGP4
- DVMRP
- PIM
- GMRP (IEEE 802.1p)
- IGMP-based multicast pruning
- TFTP (RFC 783)
- BootP (RFC 1542)
- BootP (RFC 951)
- Telnet (RFC 854)

Certifications

Category	Compliance
Emissions	FCC, CFR 47 Part 15, Subpart A ANSI C63.4D11.4 1991 FCC OST 55 VCCI Class A CISPR 16, CISPR 22 CSA C108.8-M1983 (R1989) EN55022 CE EN6100-3-2, EN60555-2
Safety	UL 1950, ANSI/NFPA-70-1993 CSA 22.2, No. 950-93 IEC 950, +A1, A2, A3, A4 EN 60950, +A1, A2, A3, A4 EMKO-TSE (74-SEC) 207/94/Nordic Explanations IEC 60825-1 MITI Ordinance 85 (Japanese) AS/NZS-3260 (Australia)

Index

Symbols

A

B

C

D

E

F

G

H

I

J

L

M

N

O

P

R

S

T

V

W