Data Sheet

Cisco Catalyst 4500 Series Supervisor **Engine II-Plus**

Cisco Catalyst 4500 Series Supervisor Engine for Medium-Sized Enterprises and Small Branch Offices

Cisco Catalyst 4500 Series integrates resiliency for advanced control of converged networks.

Overview

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus is a Cisco IOS Software-based supervisor engine that meets the needs of value-conscious customers seeking a flexible and scalable LAN solution. Optimized for wiring closets for medium-sized enterprises, education customers, or small enterprises or branch offices, the Supervisor Engine II-Plus provides the resiliency and control for converged data, voice, and video networks.

The Supervisor Engine II-Plus delivers non-blocking Layer 2 switching with basic Layer 3 and Layer 4 intelligent services to power resilient, multilayer switching solutions for converged data, voice, and video networks. It allows customers to deploy network-wide intelligent services, such as advanced quality of service (QoS), comprehensive security, and management with optimal control and resiliency. Compatible with the widely deployed Cisco Catalyst 4503, 4506, 4507R, and 4006 chassis, and with existing Cisco Catalyst 4500 Series line cards, the Supervisor Engine II-Plus helps to ensure an extended window of deployment of the modular Cisco Catalyst 4500 Series.

Figure 1
Cisco Catalyst 4500 Series Supervisor Engine II-Plus

Differences Between Supervisor Engines II and II-Plus

The Cisco Catalyst 4500 Series Supervisor Engine II and Supervisor Engine II-Plus have several differences (Table 1).

Table 1 Differences Between Supervisor Engines II and Supervisor Engine II-Plus

Feature	Supervisor Engine II	Supervisor Engine II-Plus
Platform support	Cisco Catalyst 4006, 4503, and 4506	Cisco Catalyst 4006, 4503, 4506, and 4507R
Switching Capacity	24 Gbps	64 Gbps
Throughput	18 Mpps	48 Mpps
Architecture	Three K1 application-specific integrated circuits (ASICs)	One K2 Chip Set
Multilayer Switching	Layer 2 Only	Basic L2/3/4 Services
Basic Routing Protocols	None	RIP, Static Routes, IPX (Software) Appletalk (Software)
Enhanced Routing Protocols (OSPF, (E)IGRP, BGP, IS:IS)	No	No
MAC Addresses	16K	32K
Operating System	CatOS	IOS
Transmit Queues	2Q/port	4Q/port
QoS	System Based	Port Based
DBL (Congestion Avoidance QoS Feature)	No	Yes
CPU	150 MHz	266 MHz
Redundant Capable	No	Yes (4507R only)
Onboard Flash Mem	16 MB	32 MB
Memory speed (Synchronous Dynamic RAM [SDRAM])	100 MHz (Verify)	133 MHz (Verify)
ISL	No	Yes
ACLS	No	Yes
Policers	No	Yes
IGMP Snooping	No	Yes
Compact flash	No	Yes

Supervisor Engine II-Plus Redundancy for Business Resiliency

The Cisco Catalyst 4507R chassis has been designed with an optional 1+1 redundant supervisor capability using the Supervisor Engine II-Plus for integrated resiliency. One Supervisor Engine II-Plus is designated as the primary (active) and is responsible for normal system operation. The other (secondary) serves as a standby, monitoring the operation of the primary supervisor.

The redundancy scheme using the Supervisor Engine II-Plus in the Cisco Catalyst 4507R is identical to that used by the Supervisor Engine IV. When the primary supervisor fails, the secondary supervisor assumes control of the chassis. This algorithm prevents oscillations between primary and secondary supervisors. Alerts are generated to the network monitoring software if either fails. A switchover of the supervisor can be forced by software, or by the user via console or the Simple Network Management Protocol (SNMP).

Predictable Performance and Scalability

The Cisco Catalyst 4500 Supervisor Engine II-Plus delivers a 64-Gbps switching fabric with a 48-Mpps forwarding rate in hardware for Layer 2–4 traffic. Switching performance is independent of the number of route entries or advanced Layer 3 services enabled. The Cisco Catalyst 4500 Series is optimized for multimedia applications with its advanced multicast support and wire-speed multicast switching in hardware. The Supervisor Engine II-Plus supports IGMP snooping in hardware, enhancing the performance of multimedia applications and reducing network traffic by allowing a switch to dynamically add and remove hosts from a multicast group. Protocol Independent Multicast (PIM) and Source-Specific Multicast (SSM) are supported in software, providing end users with additional scalability to support multimedia applications.

Integrated Cisco IOS Software Switching Solution

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus supports Cisco IOS Software, providing operational ease of use by allowing customers to deploy a single network operating system across their routed and switched infrastructures.

Industry-leading Cisco IOS Software integrates features for scalability, bandwidth management, security services, network resiliency, and manageability into the Cisco Catalyst 4500 Series. Cisco IOS Software provides investment protection and tight coupling of Layer 2, Layer 3, and Layer–4 services into a single, unified configuration file and system image. The Cisco Catalyst 4500 Series Supervisor Engine II-Plus defaults to Layer 2 switching upon startup and may be configured to perform basic Layers 3 and 4 switching and routing services as desired (the enhanced Layer 3 feature set is not supported).

Intelligent Network Services with QoS and Sophisticated Traffic Management

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus offers superior per-port QoS features to help ensure that network traffic is optimally classified, prioritized, and scheduled to efficiently handle multimedia, time-sensitive (voice), and mission-critical applications. The Supervisor Engine II-Plus can classify, reclassify, police, and mark incoming packets, allowing the administrator to differentiate between traffic flows and to enforce policies based on granular QoS fields. Sharing, shaping, and strict priority configurations determine scheduling of egress traffic. Like the Supervisor Engine IV, the Supervisor Engine II-Plus supports DBL, a new congestion-avoidance QoS feature.

For details on the QoS features (including DBL) of the Supervisor Engine II-Plus, refer to the Supervisor Engine II-Plus QoS overview at:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/index.htm

Comprehensive Management

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus features a single console port and a single IP address to manage all features of the system. This is yet another benefit of an integrated Layers 2–4 switching architecture. Remote in-band management is available via SNMP, Telnet client, Bootstrap Protocol (BOOTP), and Trivial File Transfer Protocol (TFTP). Support for local or remote out-of-band management is delivered through a terminal or modem attached to the console interface.

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus delivers a comprehensive set of management tools to provide the visibility and control required in the network. Managed with CiscoWorks solutions, Cisco Catalyst switches can be configured and managed to deliver end-to-end device, virtual LAN (VLAN), traffic, and policy management. The LAN management solution bundle offers tools such as CiscoWorks Resource Manager Essentials and Cisco View. These Web-based management tools offer numerous services, including automated inventory collection, software deployment, easy tracking of network changes, views into device availability, and quick isolation of error conditions.

Advanced Security

The Cisco Catalyst 4500 Supervisor Engine II-Plus supports 802.1x, Terminal Access Controller Access Control System (TACACS+), Remote Access Dial-In User Service (RADIUS) for user authentication. It also supports Secure Shell (SSH version 1 and version 2) protocols and SNMPv3 for secure remote access and network management. The Cisco Catalyst 4500 Series Supervisor Engine II-Plus offers a rich blend of network traffic security capabilities. It can perform hardware-based filtering based on access lists used to define security policies. Packets can be filtered based on source and destination IP addresses or TCP/User Datagram Protocol (TCP/UDP) ports, so users can be restricted from sensitive portions of the network. It helps prevent the man-in-the-middle attacks and IP spoofing. All ACL lookups are done in hardware; therefore, wire-speed forwarding and routing performance are not affected when enabling ACL-based security in the network.

Application Differences Between the Supervisor Engine II-Plus and Supervisor Engine IV

The Catalyst Supervisor Engine II-Plus is optimized for wiring closets for medium-sized enterprises, education customers, or small enterprise/branch offices. When enhanced routing (IGRP, EIGRP, OSPF, IS:IS, and BGP), NetFlow services, or higher performance and scalability are needed, customers should use the Supervisor Engine IV. The Supervisor Engine IV is optimized for the enterprise wiring closet, medium-sized enterprise branch office backbones, or Layer 3 distribution points. The Cisco Catalyst 4500 Series Supervisor Engine IV delivers nonblocking Layer 2/3/4 switching with enhanced L3/4 services and routing (IGRP, EIGRP, OSPF, IS:IS, and BGP) to power resilient, intelligent multilayer switching solutions for converged data, voice, and video networks.

Table 2 Differences Between the Supervisor Engine II-Plus and Supervisor Engine IV

	Supervisor II-Plus	Supervisor IV
Multilayer Switching	Basic L2/3/4 Services	Enhanced L2/3/4 Services & Routing
(E)IGRP, OSPF, IS:IS, BGP	No	Yes
CPU	266	333
NetFlow Support	No	Yes
IP FIB entries	32K (1 Fwd TCAM only)	128K (4 Fwd TCAMs)
SDRAM	256 MB	512 MB
On-Board Flash	32 MB	64 MB
Active VLANs	2K	4K
Multicast entries	12K (L3) 16K (L2)	28K (L3) 16K (L2)
STP Instance	1.5K	3K
SVI	1K	4K
Start-up Config	On-Board Flash	NVRAM (512 KB)
IGMP Snooping	Yes (8K)	Yes (16K)
ACE	8k	64k
Policers	512 Egress, 512 Ingress	1024 Egress, 1024 Ingress

Supervisor II-Plus Features at a Glance

Layer 2 Features

- Layer 2 hardware forwarding at 48 Mpps
- Layer 2 switch ports and VLAN trunks
- IEEE 802.1Q VLAN encapsulation
- Inter-Switch Link (ISL) VLAN encapsulation (excluding blocking ports on WS-X4418-GB)
- Dynamic Trunking Protocol (DTP)
- VLAN Trunking Protocol (VTP) and VTP domains
- Support for 2048 active VLANs and 4096 VLAN IDs per switch
- Per-VLAN Spanning Tree (PVST), PVST+, and PVRST+
- Spanning-tree PortFast and PortFast guard
- Spanning-tree UplinkFast and BackboneFast
- 802.1s
- 802.1w
- 802.3ad
- Spanning-tree root guard
- Cisco Discovery Protocol

- IGMP snooping v1 and v2
- Cisco EtherChannel® technology, Fast EtherChannel, and Gigabit EtherChannel technology across line cards
- Port Aggregation Protocol (PAgP)
- Unidirectional link detection (UDLD) and aggressive UDLD
- Q-in-Q pass-through
- Jumbo Frames (up to 9216 bytes)
- Baby Giants (up to 1600 bytes)
- Unidirectional Ethernet
- Route processor redundancy (RPR) (sub-minute failover time)

Layer 3 Features

- Hardware-based IP Cisco Express Forwarding routing at 48 Mpps
- Static IP routing
- RIP and RIP2
- Hot Standby Router Protocol (HSRP)
- Software routing of IPX and AppleTalk
- IGMP v1, v2, and v3
- IGMP filtering on access and trunk ports
- IP multicast routing protocols (PIM, SSM, Distance Vector Multicast Routing Protocol [DVMRP])
- Multicast Source Discovery Protocol (MSDP)
- Cisco Group Multicast Protocol (GMP) server
- Full Internet Control Message Protocol (ICMP) support
- ICMP Router Discovery Protocol

Sophisticated QoS and Traffic Management

- Per-port QoS configuration
- Support for four queues per port in hardware
- Strict priority queuing
- IP differentiated service code point (DSCP) and IP Precedence
- Classification and marking based on IP type of service (ToS) or DSCP
- Classification and marking based on full Layer 3 and Layer 4 headers (IP only)
- Input and output policing based on Layer 3 and Layer 4 headers (IP only)
- Support for 512 policers on ingress and 512 policers on egress configured as aggregate or individual
- Shaping and sharing output queue management
- DBL (congestion-avoidance QoS feature)
- No performance penalty for granular QoS functions
- Auto-QoS CLI for voice-over-IP (VoIP) deployment

Predictable Performance

- 64-Gbps switching fabric
- Layer 2 hardware forwarding at 48 Mpps
- Layer 3 hardware-based IP Cisco Express Forwarding routing at 48 Mpps
- Layer 4 TCP/UDP hardware-based filtering at 48 Mpps
- No performance penalty with advanced Layer 3 and Layer 4 services enabled
- Software-based learning at a sustained rate of 500 hosts per second
- Support for 32,768 MAC addresses
- Support for 32,000 entries in routing table (shared between unicast and multicast)
- Bandwidth aggregation up to 16 Gbps through Cisco Gigabit EtherChannel technology
- Hardware-based multicast management
- Hardware-based ACLs

Comprehensive Management

- Single console port and single IP address to manage all features of the system
- Software configuration management, including local and remote storage
- Optional compact Flash memory card to store software images for backup and easy software upgrades
- Manageable through CiscoWorks Windows network management software on a per-port and per-switch basis, providing a common management interface for Cisco routers, switches, and hubs
- SNMP v1, v2, and v3 instrumentation, delivering comprehensive in-band management
- Command-line interface (CLI)-based management console to provide detailed out-of-band management
- Remote Monitoring (RMON) software agent to support four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis
- Support for all nine RMON groups through the use of a Cisco SwitchProbe® analyzer (Switched Port Analyzer [SPAN]) port, which permits traffic monitoring of a single port, a group of ports, or the entire switch from a single network analyzer or RMON probe
- Analysis support, including ingress port, egress port, and VLAN SPAN
- Layer 2 traceroute

Advanced Security

- TACACS+ and RADIUS, which enable centralized control of the switch and restrict unauthorized users from altering the configuration
- Standard and extended ACLs on all ports
- 802.1x user authentication (with VLAN assignment and Guest VLAN extensions)
- Trusted Boundary
- Router ACLs (RACLs) on all ports (no performance penalty)
- VLAN ACLs (VACLs)
- Port ACLs (PACLs)

- Private VLANs (PVLANs) on access and trunk ports
- Dynamic Host Configuration Protocol (DHCP) snooping and Option82 insertion
- Port Security
- SSHv1 and SSHv2
- VLAN Management Policy Server (VMPS) Client
- Unicast MAC filtering
- Unicast port flood blocking
- Dynamic Address Resolution Protocol (ARP) inspection
- IP source guard

Software Requirements

The minimum software versions are as follows:

- Supervisor Engine II-Plus: Cisco IOS Software Release 12.1(19)EW or later

Hardware Requirements

- Redundant supervisor engines must match (a Supervisor Engine IV and a Supervisor Engine II-Plus cannot be mixed in the same Cisco Catalyst 4507R chassis, for example).

Technical Specifications

Supervisor Engine II-Plus Performance and Switching Specifications

- 64-Gbps nonblocking switch fabric
- 48-Mpps Layer 2 forwarding (hardware)
- 48-Mpps Layer 3 and Layer 4 forwarding, Cisco Express Forwarding-based (hardware)
- Layers 2–4 hardware-based switch engine (ASIC-based)
- Centralized design
- Unicast and multicast routing entries: 12,000
- Layer 2 multicast addresses: 16,384
- MAC addresses: 32,768
- VLANs: 2048 active VLANs
- PVST: Yes
- Uplinks: Dual 1000-Mbps Gigabit Ethernet (Gigabit Interface Converter [GBIC])

Traffic and Congestion Management

- Number of queues: four queues per port
- Type of buffers: dynamic

Switch Architecture Specifications

- Store-and-forward switching, fast 1.4-microsecond latency
- Functionally transparent line card architecture
- Packet buffering: dynamic, 16-MB shared memory

CPU and Memory Specifications

Table 3 CPU and Memory Specifications for the Supervisor Engine II-Plus

Specification	Supervisor Engine II-Plus
CPU	266 MHz
SDRAM memory	256 MB
SDRAM speed	133 MHz
Onboard Flash memory	32 MB
Removable Compact Flash memory	64 or 128 MB available from Cisco

Management

- CiscoWorks/LAN Management Solutions (LMS); includes CiscoWorks Resource Manager Essentials
- Cisco View
- SNMP v1, v2, and v3
- RMON I and II
- RFC 1213-MIB (MIB II)
- UDP-MIB
- TCP-MIB
- CISCO-FLASH-MIB
- CISCO-IMAGE-MIB
- RFC 2233 (IF-MIB)
- CISCO-CONFIG-MAN-MIB
- CISCO-MEMORY-POOL
- CISCO-CDP-MIB
- RMON-MIB lite (RFC 1757)
- RMON2-MIB lite (RFC 2021)
- HC-RMON-MIB
- SMON-MIB
- ENTITY-MIB (V1-RFC 2037) (V2- RFC 2737)
- CISCO-PROCESS-MIB
- CISCO-CONFIG-COPY-MIB
- CISCO-ENTITY-EXT-MIB
- CISCO-ENTITY-ASSET-MIB
- CISCO-ENTITY-FRU-CONTROL-MIB
- CISCO-ENTITY-SENSOR-MIB
- CISCO-ENVMON-MIB
- BRIDGE-MIB (RFC 1493)

- CISCO-PAGP-MIB
- CISCO-PRIVATE-VLAN-MIB
- CISCO-STP-EXTENSIONS-MIB
- CISCO-VLAN-MEMBERSHIP-MIB
- CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB
- IGMP-MIB
- PIM-MIB
- OSPF-MIB
- CISCO-ENTITY-VENDORTYPE-OID-MIB
- CISCO-SYSLOG-MIB

Industry Standards

- Ethernet: IEEE 802.3, 10BASE-T
- Fast Ethernet: IEEE 802.3u, 100BASE-TX, 100BASE-FX
- Gigabit Ethernet: IEEE 802.3z, 802.3ab
- IEEE 802.1D Spanning-Tree Protocol
- IEEE 802.1w rapid reconfiguration of spanning tree
- IEEE 802.1s multiple VLAN instances of spanning tree
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.1p class-of-service (CoS) prioritization
- IEEE 802.1Q VLAN
- IEEE 802.1x user authentication
- 1000BASE-X (GBIC)
- 1000BASE-X (small form-factor pluggable [SFP])
- 1000BASE-SX
- 1000BASE-LX/LH
- 1000BASE-ZX
- RMON I and II standards

Supported Line Cards and Modules

- WS-X4148-FX-MT—Cisco Catalyst 4500 Fast Ethernet Switching Module, 48-port 100BASE-FX multimode fiber (MMF) (MT-RJ)
- WS-X4148-FE-LX-MT—Cisco Catalyst 4500 Fast Ethernet Switching Module, 48-port 100BASE-LX10 single-mode fiber (SMF) (MT-RJ)
- WS-X4148-RJ—Cisco Catalyst 4500 10/100 Module, 48 ports (RJ-45)
- WS-X4148-RJ21—Cisco Catalyst 4500 10/100 Module, 48-port telco (4 x RJ-21)
- WS-X4148-RJ45V—Cisco Catalyst 4500 Inline Power 10/100, 48 ports (RJ-45)
- WS-X4232-GB-RJ—Cisco Catalyst 4500 32-port 10/100 (RJ-45), 2-Gigabit Ethernet (GBIC) Module
- WS-X4232-RJ-XX—Cisco Catalyst 4500 32-port 10/100 (RJ-45), plus modular uplink slot

- WS-X4424-GB-RJ45—Cisco Catalyst 4500 24-port 10/100/1000 Module (RJ-45)
- WS-X4302-GB—Cisco Catalyst 4500 2-port 1000BASE X (GBIC)
- WS-X4306-GB—Cisco Catalyst 4500 Gigabit Ethernet Module, 6 ports (GBIC) + 2-port 1000BASE-X (GBIC)
- WS-X4418-GB—Cisco Catalyst 4500 Gigabit Ethernet Module, server switching 18 ports (GBIC)
- WS-X4448-GB-LX—Cisco Catalyst 4500 48-port 1000BASE-LX (SFP)
- WS-X4448-GB-RJ45—Cisco Catalyst 4500 48-port 10/100/1000 Module (RJ-45)
- WS-X4548-GB-RJ45—Cisco Catalyst 4500 Enhanced 48-port 10/100/1000 Module (RJ-45)
- WS-U4504-FX-MT—Cisco Catalyst 4500 Fast Ethernet Uplink Daughter Card, 4-port 100BASE-FX (MT-RJ)
- WS-X4604-GWY—Cisco Catalyst 4500 Access Gateway Module with IP and firewall software
- WS-X4124-FX-MT—Cisco Catalyst 4000 Fast Ethernet Switching Module, 24-port 100BASE-FX (MT-RJ)[1]
- WS-G5483—Cisco 1000BASE-T GBIC
- WS-G5484—Cisco 1000BASE-SX Short-Wavelength GBIC (multimode only)
- WS-G5486—Cisco 1000BASE-LX/LH Long-Haul GBIC (single mode or multimode)
- WS-G5487—Cisco 1000BASE-ZX Extended-Reach GBIC (single mode)
- Cisco coarse wavelength-division multiplexing (CWDM) GBIC solution

Software Requirements

The Cisco Catalyst 4500 Series Supervisor Engine II-Plus is supported only in Cisco IOS Software. The minimum software version is Cisco IOS Software Release 12.1(19)EW or later.

Indicator and Port Specifications

- System status: Green (operational)/red (faulty)
- Switch utilization load: 1- to 100-percent aggregate switching usage
- Console: RJ-45 female
- Reset (switch recessed protected)
- Uplinks: link and active
- Image management port: 10/100BASE-TX (RJ-45 female) data terminal equipment (DTE); green (good), orange (disabled), off (not connected)

Environmental Conditions

- Operating temperature: 32° to 104°F (0° to 40°C)
- Storage temperature: –40° to 167°F (–40° to 75°C)
- Relative humidity: 10 to 90 percent, noncondensing
- Operating altitude: –60 to 2000m

1. Version 1.6 (shipping since December 2000) and higher supported

Regulatory Standards Compliance

Table 4 shows regulatory standards compliance details for the Cisco Catalyst Supervisor Engine II-Plus.

Table 4 Cisco Catalyst Supervisor Engine II-Plus Regulatory Standards Compliance Details

Specification	Standard
Regulatory compliance	CE marking
Safety	• UL 60950 • CAN/CSA-C22.2 No. 60950 • EN 60950 • IEC 60950 • TS 001 • AS/NZS 3260
EMC	• FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN55022 Class A • CISPR22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55022 • EN 55024 • EN 61000-6-1 • EN 50082-1 • EN 61000-3-2 • EN 61000-3-3 • ETS 300 386
Industry EMC, safety, and environmental standards	• GR-63-Core Network Equipment Building Systems (NEBS) Level 3 • GR-1089-Core Level 3 • ETS 300 019 Storage Class 1.1 • ETS 300 019 Transportation Class 2.3 (pending) • ETS 300 019 Stationary Use Class 3.1 • ETS 300 386

Ordering Information

Table 5 lists ordering information for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus.

Table 5 Ordering Information for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus

Product Number	Description
WS-X4013+	Cisco Catalyst 4500 Supervisor Engine II-Plus (Cisco IOS Software-based)
S4KL3-12119EW	Cisco IOS Software for Supervisor Engine II-Plus, III, and IV; basic Layer 3 software image (RIP, static routes, IPX, AppleTalk)
S4KL3K2-12119EW	Cisco IOS Software for Supervisor Engine II-Plus; basic Layer 3 software image, 3DES (RIP, static routes, IPX, AppleTalk)
MEM-C4K-FLD64M	Cisco Supervisor Compact Flash memory, 64-MB option
MEM-C4K-FLD128M	Cisco Supervisor Compact Flash memory, 128-MB option

Licensing

Use of RMON on the Cisco Catalyst 4006 and 4500 Series switches requires the purchase of the RMON agent license (Table 6). Only one RMON agent license is required per chassis.

Table 6 Cisco Catalyst 4500 Series Supervisor Engine II-Plus Ordering Information

Product Number	Description
WS-C4006-EMS-LIC(=)	Cisco Catalyst 4006 RMON Agent license
WS-C4503-EMS-LIC(=)	Cisco Catalyst 4503 RMON Agent license
WS-C4506-EMS-LIC(=)	Cisco Catalyst 4506 RMON Agent license
WS-C4507R-EMS-LIC(=)	Cisco Catalyst 4507R RMON Agent license

Warranty

The warranty for the Cisco Catalyst 4500 Series Supervisor Engine II-Plus is 90 days and it includes hardware replacement with a 10-day turnaround from receipt of a return materials authorization (RMA).

Service and Support

Cisco is committed to maximizing your network investment. Cisco offers a portfolio of technical support services to help ensure that your Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. Technical support services include Cisco SMARTnet® support and Software Application Services.

For more information, visit the Cisco Technical Assistance Center Web site:

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

For additional information on the Cisco Catalyst 4500 Series, visit:

http://www.cisco.com/warp/public/cc/pd/si/casi/ca4000/

For information about Cisco Catalyst 4500 Series line cards, chassis, and other supervisor engines, refer to the Cisco Catalyst 4500 Series data sheet at:

http://www.cisco.com/warp/public/cc/pd/si/casi/ca4000/prodlit/c4000_ds.htm

For additional information about Cisco products, contact:

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