Data Sheet

Cisco 12000 Series
Packet over SONET/SDH (POS) Line Cards

The Cisco® 12000 Series of packet over SONET/SDH (POS) line cards deliver state-of-the-art technology to cost-effectively scale carrier-class IP/Multiprotocol Label Switching (MPLS) packet infrastructures to meet the needs of service providers around the world (Figures 1 and 2). The POS interfaces deliver high-performance, powerful features and a full range of interface types, speeds, and connectors, enabling deployment of high-speed core, peering, and edge applications. The POS line cards provide the ideal solution to meet and exceed the ever-growing demands for higher capacity and service availability.

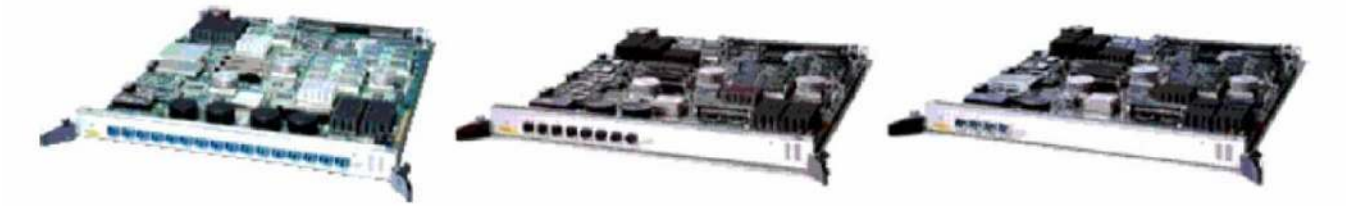
CISCO ISE POS INTERFACES—DELIVERING ROBUST HIGH-SPEED EDGE FUNCTIONS

Service providers face the challenge of meeting customer demand by building scalable, feature-rich networks that can deliver value-added services such as private IP connectivity; integrated data, voice, and video services; and tiered service offerings—at all interface rates without compromising density or line-rate performance. The Cisco IP Services Engine (ISE) line cards provide the same powerful feature set as the standard POS line cards and also accommodate service provider requirements by providing an extensive set of service-enabling edge features at line rate such as packet classification, congestion avoidance, and low-latency queuing (LLQ).

Figure 1. Cisco 12000 Series 1-Port OC-48c/STM-16c POS ISE Line Card



Figure 2. Cisco 12000 Series 16-, 8-, and 4-Port OC-3c/STM-1c POS ISE Line Cards



All contents are Copyright © 1992–2006 Cisco Systems, Inc. All rights reserved. Important Notices and Privacy Statement.

PRODUCT FEATURES

Table 1 describes the basic features on the Cisco 12000 Series POS line cards.

Table 1. Product Features

Feature	Description
Performance	• Line-rate throughput for IP forwarding and MPLS switching • Performance sustained in fully loaded system • No performance drops as quality-of-service (QoS) or accounting features are enabled
Reliability and Availability	• Online insertion and removal (OIR) enabling insertion and removal of line cards without affecting traffic • Mean time between failure (MTBF) more than 80,000 hours
Network Management	• Cisco IOS® Software command-line interface (CLI) • Cisco 12000 Manager for configuration, fault, and performance element management • Simple Network Management Protocol (SNMP) MIBs: – SONET/SDH MIB (RFC 2558) – MIB-II
Statistics and Accounting	• Byte and packet counting per ingress port for IP and MPLS packets • Byte and packet counting per ingress port for IP and MPLS type-of-service (ToS) bits • Packet counting for Modified Deficit Round Robin (MDRR) and Weighted Random Early Detection (WRED) functions • Packet and byte counting for committed-access-rate (CAR) feature • Counting per ingress port for IP prefixes and Cisco Express Forwarding adjacencies
SONET/SDH Functions	• Error counts for B1, B2, and B3 • Threshold crossing alerts (TCAs), far end block error path (FEBE) for B1, B2, and B3 with threshold that can be set • Loss of signal (LOS), loss of frame (LOF), line alarm indicator signal (LAIS), path alarm indicator signal (PAIS), loss of pointer (LOP), line remote defect indicator (LRDI), path remote defect indicator (PRDI), signal failure (SF), signal degrade (SD), line remote error indicator (line FEBE), and path remote error indicator (path FEBE) • Performance monitoring: Error counts for B1, B2, and B3; TCAs; and FEBE for B1, B2, and B3 with threshold that can be set • Synchronization – Local (internal) or loop timed (recovered from network) – Stratum 3 clock accuracy over full operating temperature – Pointer activity monitoring • Local (diagnostic) and line (network) loopback • Payload mapping – $1 + X^{43}$ self-synchronous scrambler

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

PRODUCT SPECIFICATIONS

Table 2 provides specifications for the different Cisco 12000 Series POS line cards.

Table 2. Product Specifications

Line Card and Description	Forwarding Engine	Cisco IOS Software Release	Chassis Supported	Per-Chassis Port Densities	Per-Rack Port Densities
2-Port OC-192c POS **2-Port OC-192c/STM-64c POS**	Engine 6	• 12.0(27)S	• Cisco 12816 • Cisco 12810	• 30 ports • 18 ports	• 30 ports • 36 ports
1-Port OC-192c POS ES **1-Port OC-192c/STM-64c POS ES**	Engine 4+	• 12.0(21)S • 12.0(21)ST	• Cisco 12416 • Cisco 12816 • Cisco 12410 • Cisco 12810 • Cisco 12406 • Cisco 12404	• 15 ports • 15 ports • 9 ports • 9 ports • 5 ports • 3 ports	• 15 ports • 15 ports • 18 ports • 18 ports • 20 ports • 24 ports
8-Port OC-48c POS **8-Port OC-48c/STM-16c POS**	Engine 6	• 12.0(27)S	• Cisco 12816 • Cisco 12810	• 120 ports • 72 ports	• 120 ports • 144 ports
4-Port OC-48c POS ES **4-Port OC-48c/STM-16c POS ES**	Engine 4+	• 12.0(21)S • 12.0(21)ST	• Cisco 12416 • Cisco 12816 • Cisco 12410 • Cisco 12810 • Cisco 12406 • Cisco 12404	• 60 ports • 60 ports • 36 ports • 36 ports • 20 ports • 12 ports	• 60 ports • 60 ports • 72 ports • 72 ports • 80 ports • 96 ports
1-Port OC-48c POS ISE **1-Port OC-48c/STM-16c POS ISE**	Engine 3	• 12.0(21)S • 12.0(21)ST	• Cisco 12x16 • Cisco 12x10 • Cisco 12x06 • Cisco 12x04	• 15 ports • 9 ports • 5 ports • 3 ports	• 15 ports • 18 ports • 20 ports • 24 ports
4-Port OC-12c POS ISE **4-Port OC-12c/STM-4c POS ISE**	Engine 3	• 12.0(21)S • 12.0(21)ST	• Cisco 12x16 • Cisco 12x10 • Cisco 12x06 • Cisco 12x04	• 60 ports • 36 ports • 20 ports • 12 ports	• 60 ports • 72 ports • 80 ports • 96 ports
16-Port OC-3c POS ISE **16-Port OC-3c/STM-1c POS ISE**	Engine 3	• 12.0(21)S • 12.0(21)ST	• Cisco 12x16 • Cisco 12x10 • Cisco 12x06 • Cisco 12x04	• 240 ports • 144 ports • 80 ports • 48 ports	• 240 ports • 288 ports • 320 ports • 384 ports
8-Port OC-3c POS ISE **8-Port OC-3c/STM-1c POS ISE**	Engine 3	• 12.0(22)S	• Cisco 12x16 • Cisco 12x10 • Cisco 12x06 • Cisco 12x04	• 120 ports • 72 ports • 40 ports • 24 ports	• 120 ports • 144 ports • 160 ports • 192 ports

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

Line Card and Description	Forwarding Engine	Cisco IOS Software Release	Chassis Supported	Per-Chassis Port Densities	Per-Rack Port Densities
4-Port OC-3c POS ISE **4-Port OC-3c/STM-1c POS ISE**	Engine 3	• 12.0(22)S	• Cisco 12x16 • Cisco 12x10 • Cisco 12x06 • Cisco 12x04	• 60 ports • 36 ports • 20 ports • 12 ports	• 60 ports • 72 ports • 80 ports • 96 ports

PHYSICAL AND ELECTRICAL SPECIFICATIONS

Table 3 provides details about the physical and electrical specifications of the different Cisco 12000 Series POS line cards.

Table 3. Physical and Electrical Specifications

Line Card	Dimensions	Weight	Power	Route Memory (default and maximum)	LEDs
2-Port OC-192c POS	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	9.51 lb (4.32 kg)	174W Maximum	• Default: 512 MB • Maximum: 512 MB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
1-Port OC-192c POS ES	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	9.51 lb (4.32 kg)	174W Maximum	• Default: 256 MB • Maximum: 512 MB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
8-Port OC-48c POS	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	9.51 lb (4.32 kg)	174W Maximum	• Default: 512 MB • Maximum: 512 MB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
4-Port OC-48c POS ES	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	10.21 lb (4.64 kg)	214W Maximum	• Default: 256 MB • Maximum: 512 MB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
1-Port OC-48c POS ISE	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	6.0 lb (2.7 kg)	140W Maximum	• Default: 256 MB • Maximum: 1 GB	• Enable • Receive carrier • Receive packets • Alphanumeric management display

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

Line Card	Dimensions	Weight	Power	Route Memory (default and maximum)	LEDs
4-Port OC-12c POS ISE	• Height: 14 in. (35.6 cm) • Depth: 18 in. (45.7 cm)	6.0 lb (2.7 kg)	140W Maximum	• Default: 256 MB • Maximum: 1 GB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
16-Port OC-3c POS ISE	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	6.0 lb (2.7 kg)	196W Maximum	• Default: 256 MB • Maximum: 1 GB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
8-Port OC-3c POS ISE	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	6.0 lb (2.7 kg)	196W Maximum	• Default: 256 MB • Maximum: 1 GB	• Enable • Receive carrier • Receive packets • Alphanumeric management display
4-Port OC-3c POS ISE	• Height: 14.5 in. (36.5 cm) • Depth: 18 in. (45.7 cm)	6.0 lb (2.7 kg)	196W Maximum	• Default: 256 MB • Maximum: 1 GB	• Enable • Receive carrier • Receive packets • Alphanumeric management display

OPTICAL SPECIFICATIONS

Table 4 provides details about the optical specifications of the different Cisco 12000 Series POS line cards.

Table 4. Optical Specifications

Line Card	Tx Power		Rx Power		Po (dB)	DSRmax* ps/nm	Target Distance (km)**	Rx Wavelength (nm)	Tx Wave-length (nm)	Fiber Type***	Compliance****	
	P_{Tmax} (dBm)	P_{Tmin} (dBm)	P_{Rmax} (dBm)	P_{Rmin} (dBm)							Telcordia	ITU
OC-192											GR-253	G.691
OC-192 SR-1	–1	–6	–1	–11	1	6.6	2	1260-1600	1290–1330	G.652	SR-1	I-64.1
OC-192 IR	2	–1	–1	–14	2	800	40	1260-1600	1530–1565	G.652	IR-2	S-64.2b
OC-192 LR	7	4	–9	–22	2	1600	80	1260-1600	1530–1565-	G.652	Cisco LR	S-64.2b
OC-48											GR-253	G.957
OC-48/POS-SR-xx and OC-	–3	–10	-3	–18	1	12	2	1260-	1266–	G.652	SR-1	I-16

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

Line Card	Tx	Power	Rx	Power	Po (dB)	DSRmax* ps/nm	Target Distance (km)**	Rx Wavelength (nm)	Tx Wave-length (nm)	Fiber Type***	Compliance****	
48/SRP-SR-SC								1600	1360			
OC-48/POS-1550-xx***** and OC-48/SRP-LR-SC	+3	–2	–9	–28	2	1600	80	1260-1600	1500–1580	G.652 G.654***	LR-2	L-16.2
OC-48 Pluggable Optic Modules												
POM-OC48-SR-LC	–3	–10	–3	–18	1	12	2	1260-1600	1266–1360	G.652	SR-1	I-16
POM-OC48-IR1-LC	0	–5	0	–18	1	–	15	1260-1600	1266–1360	G.652	IR-1	S-16.1
POM-OC48-LR2-LC	3	–2	–9	–28	2	1600	80	1260-1600	1500–1580	G.652	LR-2	L-16.2
OC-12											GR-253	G.957
OC-12/POS-MM****** and OC-12/SRP-MM******	–14	–20	–14	–23	–	–	–		–	–	NA	NA
OC-12/POS-SM and OC-12/SRP-SM	–8	–15	–8	–28	1	46 (74)	15	1260-1600	1293–1334	G.652	IR-1	S-4.1
OC-3											GR-253	G.957
OC-3 POS-MM******	–14	–20	–14	–23	1	–	–		–	–	NA	NA
OC-3 POS-SM	–8	–15	–8	–28	1	96	15	1260-1600	1261–1360	G.652	IR-1	S-1.1
OC-3 POS-LR	0	–5	–10	–34	1	246 (NA)	40	1260-1600	1263–1360	G.652	LR-1	L-1.1

* In some cases there are two different types of lasers with different spectral widths specified in one application code. Different spectral widths introduce different values of D_{SRmax}.

** Target distances are used for classification only and not for specification.

*** Either G.652 or G.654 fiber can be used for long-reach (LR) applications. G.654 has low fiber attenuation at 1550-nm wavelength.

**** Contact your Cisco account team for details about compliance level to these standards.

***** xx=SC or FC connectors

****** There are no Telcordia or ITU specifications for multimode SONET/SDH interfaces.

Note: Cisco 1-port OC-192c/STM-64c POS and DPT line cards with short reach (SR)-2 optics are compliant with GR-1337-CORE.

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

TELCORDIA AND ITU OPTICAL INTERFACE STANDARDS

Table 5 gives details about Telcordia and ITU interface standards.

Table 5. Telcordia and ITU Optical Interface Standards

Telcordia	SR-1		IR-2	SR-1		IR-1	IR-1	LR-1
ITU	I-64.1	LR	S-64.2b	I-16	LR-2 L-16.2	S-4.1	S-1.1	L-1.1
System	OC-192	OC-192	OC-192	OC-48	OC-48	OC-12	OC-3	OC-3
Transmitter	SLM (DFB)		SLM (DFB)	MLM (FP)	SLM (DFB)	MLM (FP)	MLM (FP)	MLM/SLM*
Tx Wavelength (nm)	1290–1330	1530-1565	1530–1565	1266–1360	1500–1580	1293–1334	1261–1360	1263–1360
Rx Wavelength (nm)	1260-1600	1260-1600	1260-1600	1260-1600	1260-1600	1260-1600	1260-1600	1260-1600
P_{Tmax} (dBm)	–1	7	2	–3	3	–8	–8	0
P_{Tmin} (dBm)	–6	4	–1	–10	–2	–15	–15	–5
Δλrms (nm)	–	–	–	4	–	4, (2.5)**	7.7	3/NA*
$\Delta\lambda_{20}$ (nm)	1	–	NA	–	<1	–	–	NA/1
Receiver								
P_{Rmax} (dBm)	–1	–9	–1	–3	–9	–8	–8	–10
P_{Rmin} (dBm)	–11	–22	–14	–18	–28	–28	–28	–34
Optical Path								
Target Distance (km)[3]	2	80	40	2	80	15	15	40
Path Penalty Po (dB)	1	2	2	1	2	1	1	1
Link Budget (dB)	4	24	11	8	26	13	13	29
D_{SRmax} (ps/nm)	6.6	1600	800	12	1600	46, (74)**	96	246/NA*
Fiber Type	G.652	G.652	G.652	G. 652	G.652, G.654	G.652	G.652	G.652

* Both MLM and SLM lasers are specified. If the transmitter is an MLM laser, the specification for the MLM laser should be applied. If the transmitter is an SLM laser, the specification for the SLM laser should be applied.

** In OC-12, I-1, S-4.1, if maximum Δλrms of MLM laser •2.5nm, then the D_{SRmax}=74. If maximum Δλrms of MLM laser •4 nm and •2.5 nm, then the D_{SRmax}=46.

*** The target distances are to be used for classification only and not for specification.

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

ENVIRONMENTAL APPROVALS AND COMPLIANCE

Table 6 gives standards-compliance information for the Cisco 12000 Series POS line cards.

Table 6. Compliance and Agency Approvals

Feature	Description
Environmental	• Operating temperature: 32 to 104°F (0 to 40°C) • Storage temperature: –4 to 149°F (–20 to 65°C) • Relative humidity: – 10 to 90%, noncondensing, operating conditions – Up to 95%, noncondensing, nonoperating conditions
Safety	• UL/CSA/IEC/EN 60950-1 • AS/NZS 60950 • EN60825/IEC 60825 Laser Safety • FDA – Code of Federal Regulations (USA) Laser Safety
EMI	• FCC Part 15 Class A • ICES 003 Class A • AS/NZS Class A • CISPR 22 (insert Class A or Class B (up to 1 GHz) • EN55022 (insert Class A or Class B (up to 1 GHz) • VCCI Class A • BSMI Class A • IEC/EN61000-3-2 Power Line Harmonics • IEC/EN61000-3-3 Voltage Fluctuations and Flicker • Note 1: Group 1 systems meet CISPR/EN55022 Class B (up to 1 GHz). Group 2 systems meet CISPR/EN55022 Class A. Use Class B (up to 1 GHz) for line cards designed for use in Group 1 systems. New chassis not requiring Class B explicitly should use Class A. • Group 1: Cisco 12006, 12010, 12404, 12406, 12410, 12016, 12416, 12810, and 12816 • Group 2: Cisco 12008 and 12012
Immunity (Basic Standards)	• IEC/EN61000-4-2 Electrostatic Discharge Immunity (8-kV contact, 15-kV air) • IEC/EN61000-4-3 Radiated Immunity (10 V/m) • IEC/EN61000-4-4 Electrical Fast Transient Immunity (2-kV power, 1-kV signal) • IEC/EN61000-4-5 Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN61000-4-5 Surge Signal Port (1-kV indoor, 2-kV outdoor) • IEC/EN61000-4-5 Surge DC Port (1 kV) • IEC/EN61000-4-6 Immunity to Conducted Disturbances (10 Vrms) • IEC/EN61000-4-8 Power Frequency Magnetic Field Immunity (30 A/m) • IEC/EN61000-4-11 Voltage Dips, Short Interruptions, and Voltage Variations

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

Feature	Description
ETSI and EN	• EN 300 386 Telecommunications Network Equipment (EMC) • EN55022 Information Technology Equipment (Emissions) • EN55024 Information Technology Equipment (Immunity) • EN50082-1/EN61000-6-1 Generic Immunity Standard
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements: • GR-1089-CORE EMC and Safety • GR-63-CORE Physical Protection • SR-3580 NEBS Criteria Levels (Level 3)

ORDERING INFORMATION

To place an order, contact your local Cisco Systems® representative or visit the ordering page on the Cisco Website. Use the ordering information in Table 7.

Table 7. Ordering Information

Product Part Number	Description
2OC192/POS-IR-SC(=)	2-port OC-192c/STM-64c POS line card, IR optics (Engine 6)
2OC192/POS-SR-SC(=)	2-port OC-192c/STM-64c POS line card, SR optics (Engine 6)
2OC192/POS-VSR(=)	2-port OC-192c/STM-64c POS line card, very-short-reach (VSR) optics (Engine 6)
OC192E/POS-LR-SC(=)	1-port OC-192/STM-64 POS line card, LR optics (Engine 4+)
OC192E/POS-IR-SC(=)	1-port OC-192c/STM-64c POS line card, IR optics (Engine 4+)
OC192E/POS-SR-SC(=)	1-port OC-192c/STM-64c POS line card, SR optics (Engine 4+)
OC192E/POS-VSR(=)	1-port OC-192c/STM-64c POS line card, VSR optics (Engine 4+)
8OC-48/POS-SFP(=)	8-port OC-48c/STM-16c POS line card, Small Form-Factor Pluggable (SFP) optics (Engine 6)
OC48X/POS-LR-SC(=)	1-port OC-48c/STM-16c POS line card, LR optics (Engine 3)
OC48X/POS-SR-SC(=)	1-port OC-48c/STM-16c POS line card, SR optics (Engine 3)
4OC48E/POS-LR-SC(=)	4-port OC-48c/STM-16c POS line card, LR optics (Engine 4+)
4OC48E/POS-SR-SC(=)	4-port OC-48c/STM-16c POS line card, SR optics (Engine 4+)
4OC12X/POS-M-SC-B(=)	4-port OC-12/STM-4c POS line card, multimode optics (Engine 3)
4OC12X/POS-I-SC-B(=)	4-port OC-12/STM-4c POS line card, multimode optics (Engine 3)
16OC3X/POS-I-LC-B(=)	16-port OC-3/STM-1 POS line card, IR optics (Engine 3)
16OC3X/POS-M-MJ-B(=)	16-port OC-3/STM-1 POS line card, multimode optics (Engine 3)
8OC3X/POS-IR-LC-B(=)	8-port OC-3/STM-1 POS line card, IR optics (Engine 3)
8OC3X/POS-MM-MJ-B(=)	8-port OC-3/STM-1 POS line card, multimode optics (Engine 3)
4OC3X/POS-LR-LC-B(=)	4-port OC-3/STM-1 POS line card, LR optics (Engine 3)
4OC3X/POS-IR-LC-B(=)	4-port OC-3/STM-1 POS line card, IR optics (Engine 3)
4OC3X/POS-MM-MJ-B(=)	4-port OC-3/STM-1 POS line card, multimode optics (Engine 3)

© 2006 Cisco Systems, Inc. All rights reserved.
Important notices, privacy statements, and trademarks of Cisco Systems, Inc. can be found on cisco.com.

SERVICE AND SUPPORT

Cisco Systems delivers innovative services programs through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, contact your local Cisco representative or visit the Cisco Website.

FOR MORE INFORMATION

For more information about the Cisco 12000 Series POS interfaces, contact your local Cisco representative or visit: http://www.cisco.com/go/12000

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**

©2006 Cisco Systems, Inc. All rights reserved. CCVP, the Cisco logo, and the Cisco Square Bridge logo are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networking Academy, Network Registrar, Packet, PIX, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0609R)