



Cisco 10-Gigabit Ethernet X2 Transceiver Modules Installation Note

Revised: September 23, 2011

Product Numbers:

X2-10GB-SR=	X2-10GB-LR=	X2-10GB-ER=	X2-10GB-ZR=
X2-10GB-CX4=	X2-10GB-LX4=	X2-10GB-LRM=	DWDM-X2-xx.xx=
X2-10GB-T=			

This installation note provides the installation instructions for the 10-Gigabit Ethernet X2 transceiver modules listed above and contains these sections:

- [Overview, page 1](#)
- [Safety, page 7](#)
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- [Installing the 10-Gigabit Ethernet X2 Transceiver Module, page 13](#)
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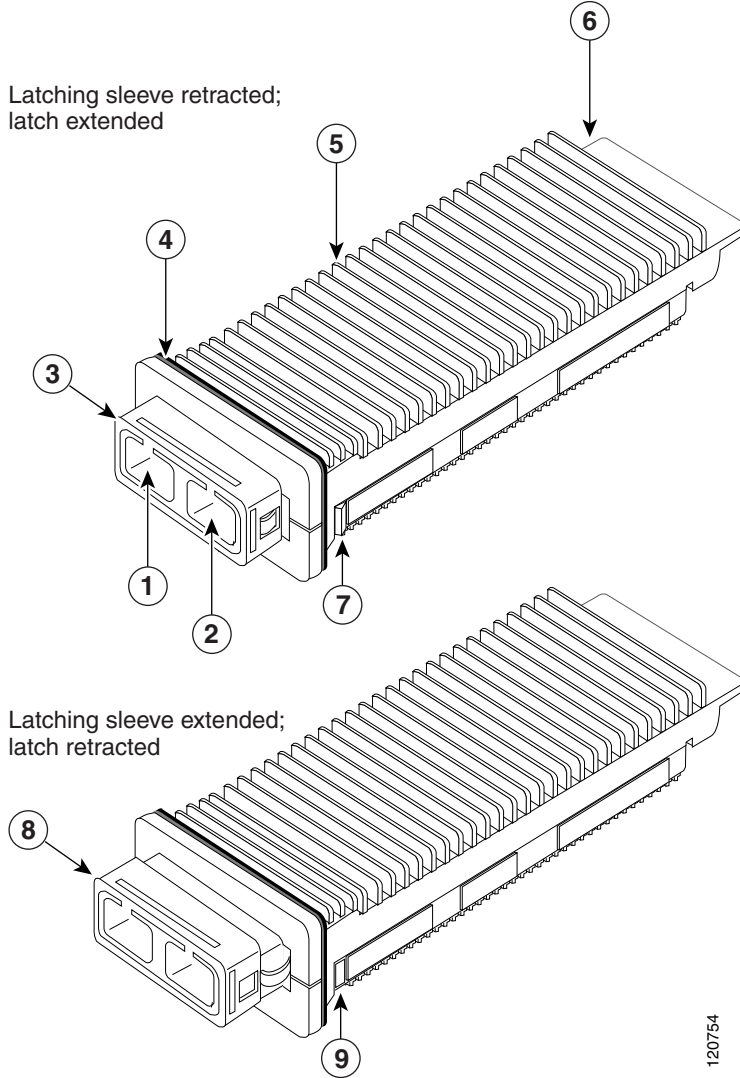
Overview

The 10-Gigabit Ethernet X2 transceiver module is a hot-swappable I/O device that plugs into 10-Gigabit Ethernet ports. [Figure 1](#) shows an X2 transceiver module with the major features identified. The X2 transceiver module connects the electrical circuitry of the system with the optical or copper network.



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Figure 1 10-Gigabit Ethernet X2 Transceiver Module (Optical Version Shown)



120754

1	Transmit optical bore	6	Module connector
2	Receive optical bore	7	Latch (extended)
3	Latching sleeve (retracted)	8	Latching sleeve (extended)
4	EMI gasket flange	9	Latch (retracted)
5	Transceiver heat sink		

 **Note**

The 10-Gigabit Ethernet X2 transceiver module has either a spring-loaded EMI gasket flange or a non-spring-loaded EMI gasket flange. Both transceiver module types are functionally identical.

The X2 transceiver module product numbers and brief descriptions are provided in [Table 1](#) and [Table 2](#).

Table 1 10-Gigabit Ethernet X2 Transceiver Modules

Product Number	Description
X2-10GB-SR	Cisco 10GBASE-SR X2 transceiver module for MMF, dual SC connector
X2-10GB-LR	Cisco 10GBASE-LR X2 transceiver module for SMF, dual SC connector
X2-10GB-ER	Cisco 10GBASE-ER X2 transceiver module for SMF, dual SC connector
X2-10GB-ZR	Cisco 10GBASE-ZR X2 transceiver module for SMF, dual SC connector
X2-10GB-CX4	Cisco 10GBASE-CX4 X2 transceiver module for CX4 cable, InfiniBand 4x connector
X2-10GB-LX4	Cisco 10GBASE-LX4 X2 transceiver module for MMF, dual SC connector
X2-10GB-LRM	Cisco 10GBASE-LRM X2 transceiver module for MMF, dual SC connector
X2-10GB-T	Cisco 10GBASE-T X2 transceiver module for CAT6A or CAT7 copper cable, RJ-45 connector

Table 2 10-Gigabit Ethernet DWDM X2 Transceiver Modules

Product Number	Description	ITU Channel
DWDM-X2-60.61=	10GBASE-DWDM 1560.61 nm X2 (100-GHz ITU grid)	21
DWDM-X2-59.79=	10GBASE-DWDM 1559.79 nm X2 (100-GHz ITU grid)	22
DWDM-X2-58.98=	10GBASE-DWDM 1558.98 nm X2 (100-GHz ITU grid)	23
DWDM-X2-58.17=	10GBASE-DWDM 1558.17 nm X2 (100-GHz ITU grid)	24
DWDM-X2-56.55=	10GBASE-DWDM 1556.55 nm X2 (100-GHz ITU grid)	26
DWDM-X2-55.75=	10GBASE-DWDM 1555.75 nm X2 (100-GHz ITU grid)	27
DWDM-X2-54.94=	10GBASE-DWDM 1554.94 nm X2 (100-GHz ITU grid)	28
DWDM-X2-54.13=	10GBASE-DWDM 1554.13 nm X2 (100-GHz ITU grid)	29
DWDM-X2-52.52=	10GBASE-DWDM 1552.52 nm X2 (100-GHz ITU grid)	31
DWDM-X2-51.72=	10GBASE-DWDM 1551.72 nm X2 (100-GHz ITU grid)	32
DWDM-X2-50.92=	10GBASE-DWDM 1550.92 nm X2 (100-GHz ITU grid)	33
DWDM-X2-50.12=	10GBASE-DWDM 1550.12 nm X2 (100-GHz ITU grid)	34
DWDM-X2-48.51=	10GBASE-DWDM 1548.51 nm X2 (100-GHz ITU grid)	36
DWDM-X2-47.72=	10GBASE-DWDM 1547.72 nm X2 (100-GHz ITU grid)	37
DWDM-X2-46.92=	10GBASE-DWDM 1546.92 nm X2 (100-GHz ITU grid)	38
DWDM-X2-46.12=	10GBASE-DWDM 1546.12 nm X2 (100-GHz ITU grid)	39
DWDM-X2-44.53=	10GBASE-DWDM 1544.53 nm X2 (100-GHz ITU grid)	41
DWDM-X2-43.73=	10GBASE-DWDM 1543.73 nm X2 (100-GHz ITU grid)	42
DWDM-X2-42.94=	10GBASE-DWDM 1542.94 nm X2 (100-GHz ITU grid)	43
DWDM-X2-42.14=	10GBASE-DWDM 1542.14 nm X2 (100-GHz ITU grid)	44
DWDM-X2-40.56=	10GBASE-DWDM 1540.56 nm X2 (100-GHz ITU grid)	46
DWDM-X2-39.77=	10GBASE-DWDM 1539.77 nm X2 (100-GHz ITU grid)	47

Table 2 10-Gigabit Ethernet DWDM X2 Transceiver Modules (continued)

Product Number	Description	ITU Channel
DWDM-X2-38.98=	10GBASE-DWDM 1538.98 nm X2 (100-GHz ITU grid)	48
DWDM-X2-38.19=	10GBASE-DWDM 1538.19 nm X2 (100-GHz ITU grid)	49
DWDM-X2-36.61=	10GBASE-DWDM 1536.61 nm X2 (100-GHz ITU grid)	51
DWDM-X2-35.82=	10GBASE-DWDM 1535.82 nm X2 (100-GHz ITU grid)	52
DWDM-X2-35.04=	10GBASE-DWDM 1535.04 nm X2 (100-GHz ITU grid)	53
DWDM-X2-34.25=	10GBASE-DWDM 1534.25 nm X2 (100-GHz ITU grid)	54
DWDM-X2-32.68=	10GBASE-DWDM 1532.68 nm X2 (100-GHz ITU grid)	56
DWDM-X2-31.90=	10GBASE-DWDM 1531.90 nm X2 (100-GHz ITU grid)	57
DWDM-X2-31.12=	10GBASE-DWDM 1531.12 nm X2 (100-GHz ITU grid)	58
DWDM-X2-30.33=	10GBASE-DWDM 1530.33 nm X2 (100-GHz ITU grid)	59

**Note**

The dual SC connectors on the X2 transceiver modules support network interface cables with either Physical Contact (PC) or Ultra-Physical Contact (UPC) polished face types. The dual SC connectors on the X2 transceiver modules do not support network interface cables with an Angle Polished Connector (APC) polished face type.

[Table 3](#) lists the port cabling specifications for the 10-Gigabit Ethernet X2 transceiver modules. [Table 4](#) lists the X2 transceiver modules optical transmit and receive specifications.

Table 3 X2 Transceiver Port Cabling Specifications

X2 Product Number	Wavelength (nm)	Cable Type	Core Size (microns)	Modal Bandwidth (MHz/km)	Maximum Cabling Distance ¹
X2-10GB-SR	850	MMF	62.5	160	26 m (85.3 feet)
			62.5	200	33 m (108.3 feet)
			50.0	400	66 m (216.5 feet)
			50.0	500	82 m (269 feet)
			50.0	2000	300 m (984.3 feet)
X2-10GB-LR	1310	SMF	G.652 fiber	—	10 km (6.21 miles)
X2-10GB-ER ²	1550	SMF	G.652 fiber	—	40 km (24.84 miles) ³
X2-10GB-ZR	1550	SMF	G.652 fiber	—	80 km (49.72 miles) ⁴
X2-10GB-LX4	1310	MMF	62.5	500	300 m (984.3 feet)
			50.0	400	240 m (787.4 feet)
			50.0	500	300 m (984.3 feet)
X2-10GB-CX4	—	InfiniBand (copper)	—	—	15 m (49.2 feet)
X2-10GB-LRM	1310	MMF	62.5	500	220 m (722 feet)
			50.0	400	100 m (328 feet)
			50.0	500	220 m (722 feet)

Table 3 X2 Transceiver Port Cabling Specifications (continued)

X2 Product Number	Wavelength (nm)	Cable Type	Core Size (microns)	Modal Bandwidth (MHz/km)	Maximum Cabling Distance ¹
DWDM-X2-xx.xx	See Table 5	SMF	G.652 fiber	—	80 km (49.72 miles) ⁴
X2-10GB-T	—	CAT6A/ CAT7 (copper)	—	—	100 m (328 feet)

1. Minimum cabling distance for optical X2 transceivers is 2 meters according to the IEEE 802.3ae standard.
2. Requires a 5-dB 1550-nm, fixed-loss attenuator for distances less than 20 km.
3. For distances up to 30 km, no special link design rules need to be considered. Link distances beyond 30 km require that you verify the cable characteristics, especially the cable's loss value.
4. When shorter distances of SMF are used, an inline optical attenuator (10 dB) must be used to avoid overloading and damaging the receiver.

Table 4 X2 Transceiver Modules Optical Transmit and Receive Specifications

X2 Product Number	Transceiver Type	Transmit Power (dBm)	Receive Power (dBm)	Transmit and Receive Wavelength (nm)
X2-10GB-SR	10GBASE-SR, 850-nm MMF	-1.0 (Max) -7.3 (Min)	-1.0 (Max) -9.9 (Min)	840 to 860
X2-10GB-LR	10GBASE-LR, 1310-nm SMF	0.5 (Max) -8.2 (Min)	0.5 (Max) -14.4 (Min)	1260 to 1355
X2-10GB-ER	10GBASE-ER, 1550-nm SMF	4.0 (Max) -4.7 (Min)	-1.0 (Max) -15.8 (Min)	1530 to 1565
X2-10GB-ZR	10GBASE-ZR, 1550-nm SMF	4.0 (Max) 0 (Min)	-7.0 (Max) -24.0 (Min)	1530 to 1565
X2-10GB-LX4	10GBASE-LX4 WWDM 1300-nm MMF	-0.5 per lane (Max) -6.75 per lane in OMA (Min)	-0.5 per lane (Max) -14.25 per lane in OMA (Min)	Four lanes; overall range: 1269 to 1356
X2-10GB-LRM	10GBASE-LR, 1310-nm MMF	0.5 (Max) -6.5 (Min)	0.5 (Max) -8.4 (Min average) and -6.4 (Min in OMA)	1260 to 1355

Table 5 lists the optical specifications of the DWDM X2 transceiver modules.

Table 5 DWDM X2 Transceiver Modules Optical Transmit and Receive Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter						
Spectral Width	—	—	—	0.2	m	Full width, -20 dB from maximum, with resolution bandwidth (RBW) = 0.01 nm.
Transmitter Center Wavelength	—	x-100	x	x+100	pm	Refer to Table 2 for center wavelengths.
Side-Mode Suppression Ratio	SMSR	30	—	—	dB	—
Transmitter Extinction Ratio	OMI	9	—	—	dB	—
Transmitter Optical Output Power	P-out	-1.0	—	3.0	dBm	Average power coupled into single-mode fiber.
Receiver						
Receiver Optical Input Wavelength	—	1530	—	1565	nm	—
Receiver Damage Threshold	—	—	—	-1	dBm	—
Dispersion Tolerance	—	-500	—	1600	ps/nm	—
Power-Limited Performance (measured at optical signal-to-noise ratio [OSNR] of 30 dB at 0.1-nm RBW)						
Optical Input Power	Pin	-23.0	—	-7.0	dBm	¹
Dispersion Power Penalty	—	—	—	3	dB	¹
Noise-Limited Performance (measured at OSNR of 24 dB at 0.1-nm RBW)						
Optical Input Power	Pin	-17.0	—	-7.0	dBm	¹
Dispersion OSNR Penalty	—	—	—	3	dB	¹

1. At bit error rate (BER) = 10e-12 with an IEEE802.3 test pattern.

Safety

Safety warnings appear throughout this publication to highlight circumstances that might harm you or the equipment. A warning symbol precedes each warning statement.

Statement 1071—Warning Definition



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelyyn liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR**Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告 重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 **중요 안전 지침**

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES**Advarsel** **VIGTIGE SIKKERHEDSANVISNINGER**

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskadedigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER**تحذير****إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمة الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje **VAŽNE SIGURNOSNE NAPOMENE**

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY**Προειδοποίηση ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ**

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνηθισμένες πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ**אזהרה****הוראות בטיחות חשובות**

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה**Opomena ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА**

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОБИЕ НАПАТСТВИЈА

Ostrzeżenie WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ**Upozornenie DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD**Warning****Class 1 laser product.** Statement 1008**Warning****Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.** Statement 70**Warning****Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040**Warning****Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.** Statement 1057

Required Tools

You will need these tools to install the 10-Gigabit Ethernet X2 transceiver modules:

- Small flat-blade screwdriver for removing the X2 transceiver socket covers.
- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment. For complete information on inspecting and cleaning fiber-optic connections, refer to the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document at this URL:

http://www.cisco.com/en/US/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml

Installing the 10-Gigabit Ethernet X2 Transceiver Module

**Note**

This installation procedure applies to both the spring-loaded and non-spring-loaded X2 transceiver modules.

**Caution**

The X2 transceiver is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling X2 transceivers or coming into contact with system modules.

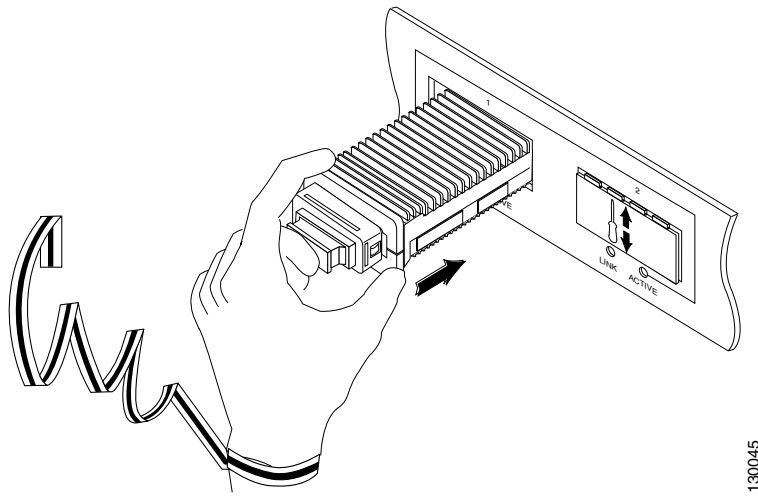
To install an X2 transceiver module, follow these steps:

- Step 1** Using a small flat-blade screwdriver, carefully pry the X2 transceiver port cover off of the system module faceplate. Use the two arrows on the port cover as guides for inserting the screwdriver blade. Save the port cover for future use.
- Step 2** Remove the new X2 transceiver module from its protective packaging.
- Step 3** Check the label on the X2 transceiver module body to verify that you have the correct model for your network.
- Step 4** Remove the dust plug from X2 transceiver module optical port and set it aside.
- Step 5** Slide the X2 transceiver into the transceiver socket on the system module front panel until the X2 transceiver EMI gasket flange makes contact with the system module faceplate. (See [Figure 2](#).)

**Note**

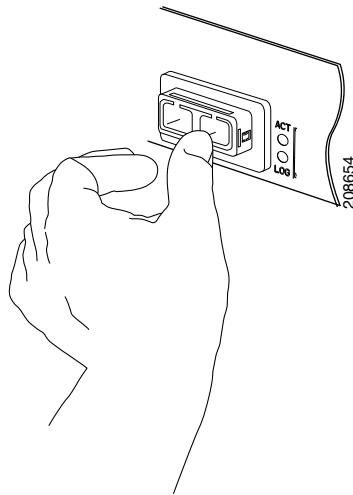
10-Gigabit Ethernet X2 transceiver modules are keyed to prevent incorrect insertion.

Figure 2 *Installing the 10-Gigabit Ethernet X2 Transceiver Module*



Step 6 Press firmly on the front of the X2 transceiver module with your thumb to fully seat the transceiver in the transceiver socket. (See [Figure 3](#).)

Figure 3 *Latching the X2 Transceiver Module*



Step 7 Verify that the X2 transceiver is properly seated and latched in the socket, by grasping the left and right sides (or the top and bottom) of the transceiver's EMI gasket flange with your thumb and forefinger and gently pulling on the transceiver. Do not pull on the latching sleeve as you will release the transceiver.

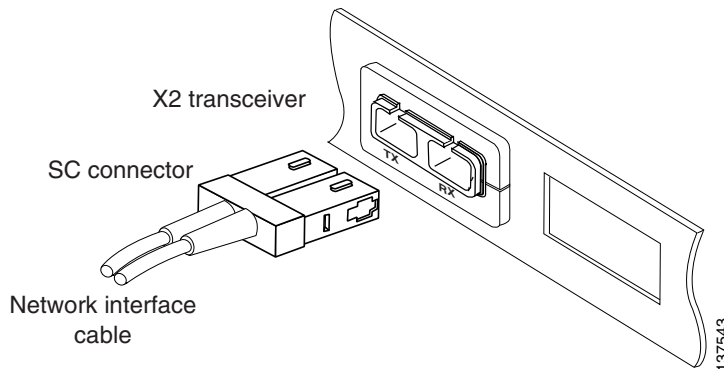
If the transceiver does not pull free, it is properly seated and latched.

If the transceiver does pull free, slide the X2 transceiver back into the socket and apply more pressure with your thumb on the front of the transceiver. Repeat the process until the X2 transceiver is securely latched in the socket.

Step 8 Reinstall the dust plug into the transceiver's optical bore until you are ready to attach the network interface cable.

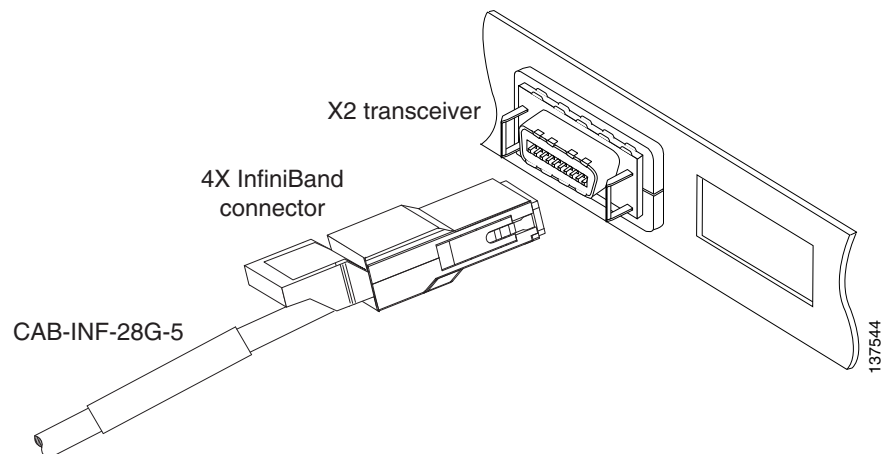
- Step 9** If you are cabling an optical X2 transceiver module, follow these sub-steps. If you are cabling a CX4 X2 transceiver module, go to step 10.
- a. Remove the dust plugs from the optical network interface cable SC connectors. Save the dust plugs for future use.
 - b. Inspect and clean the SC connector's fiber-optic end faces.
For complete information on inspecting and cleaning fiber-optic connections, refer to the *Inspection and Cleaning Procedures for Fiber-Optic Connections* document at this URL:
http://www.cisco.com/en/US/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml
 - c. Remove the dust plugs from the X2 transceiver module optical bores.
 - d. Immediately attach the network interface cable SC connectors to the X2 transceiver module. (See [Figure 4](#).)

Figure 4 Cabling an Optical 10-Gigabit Ethernet X2 Transceiver Module



- Step 10** Plug the InfiniBand cable connector into the CX4 X2 transceiver module connector. (See [Figure 5](#).) Make sure that the InfiniBand cable connector is aligned with the X2 transceiver module.

Figure 5 Cabling a CX4 (Copper) 10-Gigabit Ethernet X2 Transceiver Module

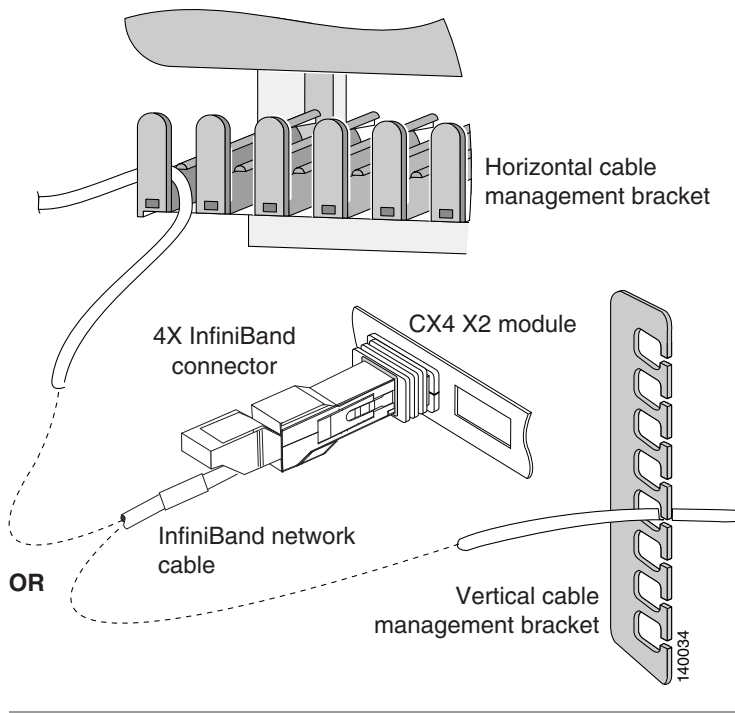


Step 11 Carefully route the InfiniBand network cable through the cable management brackets on your system. [Figure 6](#) shows how the InfiniBand cable should be routed through either a horizontal cable management bracket or a vertical cable management bracket.



Note Make sure that you route the InfiniBand cable through cable management brackets to provide adequate strain relief and cable support when cabling CX4 X2 transceiver modules. The InfiniBand cable is heavy. Without proper support, the InfiniBand cable can cause the cable connector to sag or skew. Misalignment between the cable connector and the transceiver module connector can cause intermittent connections between the cable connector pins and the CX4 X2 transceiver module pins.

Figure 6 *InfiniBand Cable Support*



Removing the 10-Gigabit Ethernet X2 Transceiver Module



Warning **Class 1 laser product.** Statement 1008



Warning **Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.** Statement 70



Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040



Warning **Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.** Statement 1057



Note This removal procedure applies to both the spring-loaded and non-spring-loaded X2 transceiver modules.

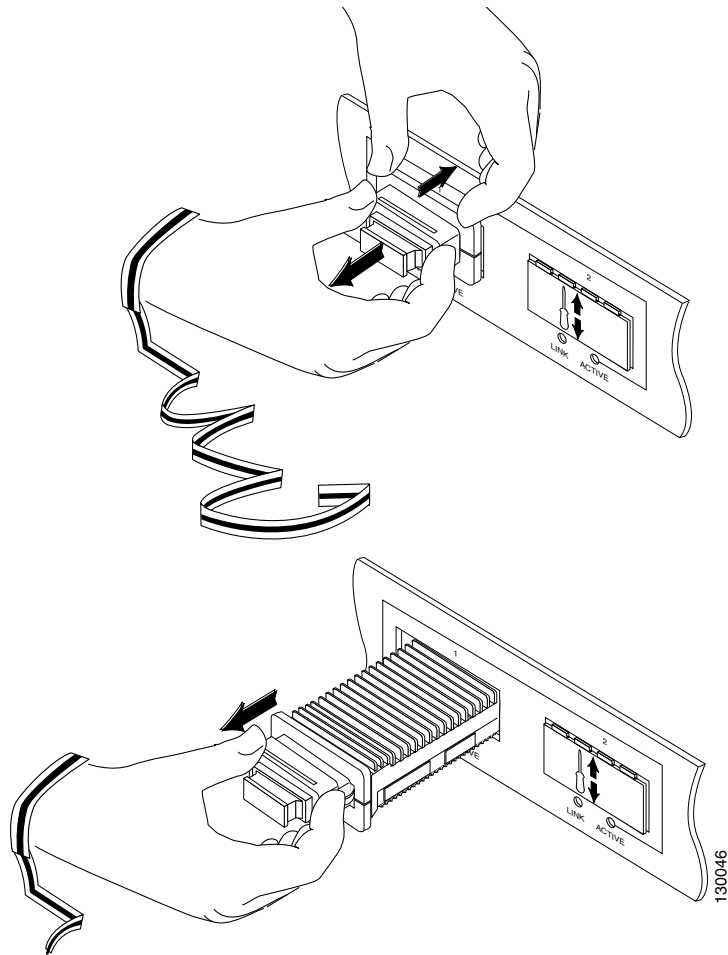


Caution The X2 transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling X2 transceiver modules or coming into contact with modules.

To remove an X2 transceiver, follow these steps:

- Step 1** Disconnect the network interface cable from the X2 transceiver module connectors. If this is an optical X2 transceiver module, immediately reinstall dust plugs in the X2 transceiver module optical bores and in the fiber-optic cable SC connectors.
- Step 2** Place your thumb and forefinger around the X2 transceiver module EMI gasket flange and gently press the EMI gasket flange against the system module front panel. (See [Figure 7](#), top view.) At the same time, with the thumb and forefinger of your other hand, grip the sides of the X2 transceiver module latching sleeve, and pull the latching sleeve out to release the X2 transceiver module from the socket connector. Release the latching sleeve when you feel the X2 transceiver module unlatch.
- Step 3** Slide the X2 transceiver module out of the socket. (See [Figure 7](#), bottom view.) Immediately place the X2 transceiver module in an antistatic bag.
- Step 4** If you are not installing an X2 transceiver module in the empty socket, place a socket cover over the empty socket opening and press on the cover until it snaps into place.

Figure 7 Removing the 10-Gigabit Ethernet X2 Transceiver Module



Translated Safety Warnings

This section repeats in multiple languages the basic warnings that appear in this document.

Statement 70—Invisible Laser Radiation Warning



Warning	Because invisible laser radiation may be emitted from the aperture of the port when no cable is connected, avoid exposure to laser radiation and do not stare into open apertures.
Waarschuwing	Omdat er onzichtbare laserstraling uit de opening van de poort geëmitteerd kan worden wanneer er geen kabel aangesloten is, dient men om blootstelling aan laserstraling te vermijden niet in de open openingen te kijken.
Varoitus	Kun porttiin ei ole kytketty kaapelia, portin aukosta voi vuotaa näkymätöntä lasersäteilyä. Älä katso avoimiin aukkoihin, jotta et altistu säteilylle.
Attention	Etant donné qu'un rayonnement laser invisible peut être émis par l'ouverture du port quand aucun câble n'est connecté, ne pas regarder dans les ouvertures béantes afin d'éviter tout risque d'exposition au rayonnement laser.
Warnung	Aus der Öffnung des Ports kann unsichtbare Laserstrahlung austreten, wenn kein Kabel angeschlossen ist. Kontakt mit Laserstrahlung vermeiden und nicht in offene Öffnungen blicken.
Avvertenza	Poiché quando nessun cavo è collegato alla porta, da quest'ultima potrebbe essere emessa radiazione laser invisibile, evitare l'esposizione a tale radiazione e non fissare con gli occhi porte a cui non siano collegati cavi.
Advarsel	Usynlige laserstråler kan sendes ut fra åpningen på utgangen når ingen kabel er tilkoblet. Unngå utsettelse for laserstråling og se ikke inn i åpninger som ikke er tildekket.
Aviso	Evite uma exposição à radiação laser e não olhe através de aberturas expostas, porque poderá ocorrer emissão de radiação laser invisível a partir da abertura da porta, quando não estiver qualquer cabo conectado.
¡Advertencia!	Quando no esté conectado ningún cable, pueden emitirse radiaciones láser invisibles por el orificio del puerto. Evitar la exposición a radiaciones láser y no mirar fijamente los orificios abiertos.
Varning!	Osynliga laserstrålar kan sändas ut från öppningen i porten när ingen kabel är ansluten. Undvik exponering för laserstrålning och titta inte in i ej täckta öppningar.

Statement 1008—Class 1 Laser Product



Warning	Class 1 laser product.
Waarschuwing	Klasse-1 laser produkt.
Varoitus	Luokan 1 lasertuote.
Attention	Produit laser de classe 1.
Warnung	Laserprodukt der Klasse 1.
Avvertenza	Prodotto laser di Classe 1.
Advarsel	Laserprodukt av klasse 1.
Aviso	Produto laser de classe 1.
¡Advertencia!	Producto láser Clase I.
Varning!	Laserprodukt av klass 1.
Figyelem	Class 1 besorolású lézeres termék.
Предупреждение	Лазерное устройство класса 1.
警告	这是 1 类激光产品。
警告	クラス1レーザー製品です。
주의	클래스 1 레이저 제품.
Aviso	Produto a laser de classe 1.
Advarsel	Klasse 1 laserprodukt.
تحذير	منتج 1 Laser Class
Upozorenje	Laserski proizvod klase 1
Upozornění	Laserový výrobek třídy 1.

Προειδοποίηση	Προϊόν λέιζερ κατηγορίας 1.
אזהרה	מוצר לייזר Class 1.
Opomena	Ласерски производ од класа 1.
Ostrzeżenie	Produkt laserowy klasy 1.
Upozornenie	Laserový výrobok triedy 1.

Statement 1040—Product Disposal



Warning

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

Waarschuwing

Het uiteindelijke wegruimen van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

Varoitus

Tämä tuote on hävitettävä kansallisten lakien ja määräysten mukaisesti.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

Avvertenza

Lo smaltimento di questo prodotto deve essere eseguito secondo le leggi e regolazioni locali.

Advarsel

Endelig kassering av dette produktet skal være i henhold til alle relevante nasjonale lover og bestemmelser.

Aviso

Deitar fora este produto em conformidade com todas as leis e regulamentos nacionais.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Varning!

Vid deponering hanteras produkten enligt gällande lagar och bestämmelser.

Figyelem

A készülék végső elhelyezéséről az adott országban érvényes törvények és előírások szerint kell intézkedni.

Предупреждение

Окончательная установка данного изделия должна выполняться в соответствии со всеми региональными и местными правилами и нормами.

警告	本产品的废弃处理应根据所有国家的法律和规章进行。
警告	この製品を廃棄処分する際は、各国の法律および規制に従って取り扱ってください。
주의	해당 국가의 관련 법규 및 규정에 따라 이 장치를 폐기해야 합니다.
Aviso	O descarte definitivo deste produto deve estar de acordo com todas as leis e regulamentações nacionais.
Advarsel	Endelig bortskaffelse af dette produkt skal ske i henhold til gældende love og regler.
تحذير	عند التخلص من المنتج يجب اتباع القوانين والتشريعات المحلية.
Upozorenje	Zbrinjavanje ovoga proizvoda u otpad treba provesti u skladu s važećim zakonima i odredbama.
Upozornění	Upozornění: Likvidace tohoto výrobku musí být provedena podle platných zákonů a předpisů.
Προειδοποίηση	Η τελική απόρριψη αυτού του προϊόντος πρέπει να γίνεται σύμφωνα με όλους τους εθνικούς νόμους και κανονισμούς.
אזהרה	סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות ולחוקי המדינה.
Opomena	Крајното фрлање на овој производ треба да се изврши во согласност со сите национални закони и прописи.
Ostrzeżenie	Ostateczna likwidacja tego urządzenia po jego wycofaniu z eksploatacji powinna odbywać się zgodnie z przepisami krajowymi.
Upozornenie	Upozornenie Likvidácia tohto výrobku musí byť vykonaná podľa platných zákonov a predpisov.
Opozorilo	Uničenje izdelka, ki ni več uporaben, mora potekati po državnih zakonih in predpisih.
警告	本產品的最終處理必須遵照國家/地區的所有法律與法規。

Statement 1057—Hazardous Radiation Exposure


Warning

Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.

Waarschuwing

Het gebruik van regelaars of bijstellingen of het uitvoeren van procedures anders dan opgegeven kan leiden tot blootstelling aan gevaarlijke straling.

Varoitus

Säätimien tai säätöjen käyttö ja toimenpiteiden suorittaminen ohjeista poikkeavalla tavalla voi altistaa vaaralliselle säteilylle.

Attention

L'utilisation de commandes, de réglages ou de procédures autres que ceux spécifiés peut entraîner une exposition dangereuse à des radiations.

Warnung

Die Verwendung von nicht spezifizierten Steuerelementen, Einstellungen oder Verfahrensweisen kann eine gefährliche Strahlenexposition zur Folge haben.

Avvertenza

L'adozione di controlli, regolazioni o procedure diverse da quelle specificate può comportare il pericolo di esposizione a radiazioni.

Advarsel

Bruk av kontroller eller justeringer eller utførelse av prosedyrer som ikke er spesifiserte, kan resultere i farlig strålingseksposering.

Aviso

O uso de controles, ajustes ou desempenho de procedimentos diferentes dos especificados pode resultar em exposição prejudicial de radiação.

¡Advertencia!

La aplicación de controles, ajustes y procedimientos distintos a los especificados puede comportar una exposición peligrosa a la radiación.

Varning!

Om andra kontroller eller justeringar än de angivna används, eller om andra processer än de angivna genomförs, kan skadlig strålning avges.

Figyelem

Az előírtaktól különböző kezelőszervek és módosítások használata, vagy ilyen eljárások végrehajtása sugárzásveszélyt rejt magában.

Предупреждение

Использование других элементов управления и регулировки, а также не указанные здесь действия могут привести к воздействию опасного излучения.

警告

不按照规定的步骤控制、调整或操作有可能造成危险的辐射外泄。

警告

記載されている手順以外の方法で性能を調節しようとする、レーザー光線の放射に曝される危険性があります。

주의

명시되어 있지 않은 제어기의 사용, 조절, 또는 절차의 수행으로 위험한 방사열이 노출될 수 있습니다.

Aviso	O uso de controles, ajustes ou procedimentos diferentes daqueles especificados pode resultar em exposição perigosa à radiação.
Advarsel	Brug af kontrolfunktioner, justeringer, eller udførelse af procedurer andre end de, der er angivet, kan resultere i udsættelse for farlig bestråling.
تحذير	قد ينتج عن استخدام أدوات التحكم أو التعديلات أو القيام بأداء عمليات غير تلك المذكورة، التعرض للإشعاعات الضارة.
Upozorenje	Korištenje kontrola, podešavanja i obavljanje postupaka koji nisu dozvoljeni može za posledicu imati izlaganje opasnim količinama zračenja.
Upozornění	Používání ovladačů a úprav nebo provádění jiných než stanovených operací může mít za následek vystavení působení nebezpečného záření.
Προειδοποίηση	Η χρήση χειριστηρίων, ρυθμίσεων ή η εκτέλεση άλλων διαδικασιών από αυτές που προδιαγράφονται μπορεί να οδηγήσει σε επικίνδυνη έκθεση σε ακτινοβολία.
אזהרה	שימוש בפקדים, התאמות או נהלי ביצוע, להוציא אלה המצוינים, עלול להסתיים בחשיפה לקרינה מסוכנת.
Opomena	Употребата на контроли, дотерувањата или вршењето на постапки поинакви од оние што се определени може да ве изложат на опасни зрачења.
Ostrzeżenie	Użycie elementów sterujących, przeprowadzanie regulacji lub wykonywanie czynności innych niż opisane może narazić użytkownika na niebezpieczne promieniowanie.
Upozornenie	Používanie ovládačov a úprav alebo uskutočňovanie iných ako stanovených operácií môže mať za následok vystavenie pôsobeniu nebezpečného žiarenia.

Related Documentation

For hardware installation and maintenance information on specific Cisco routers and switches, see the installation and configuration guide for your router or switch.

For software configuration information and support, see the Cisco IOS software configuration and command reference publications for the installed Cisco IOS software release or the Catalyst operating system software configuration and command reference publications for the installed Catalyst operating system software release.

A compatibility matrix for 10-Gigabit transceivers is available at the following URL:

http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_6974.html

The compatibility matrix provides a listing of the available X2 transceivers, the hardware platforms they are supported on, and the minimum software version required to operate the X2 transceivers.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

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